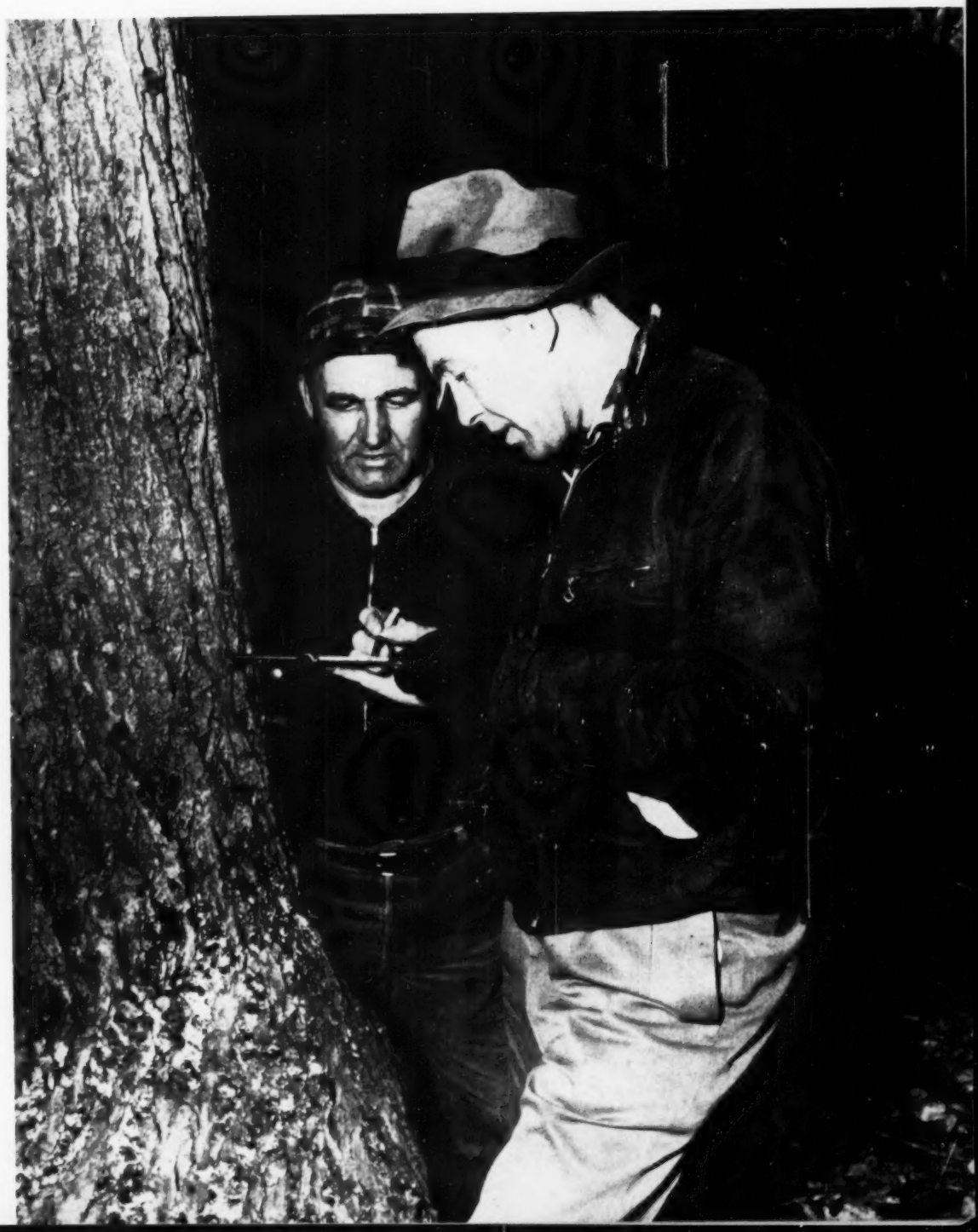
Journal of

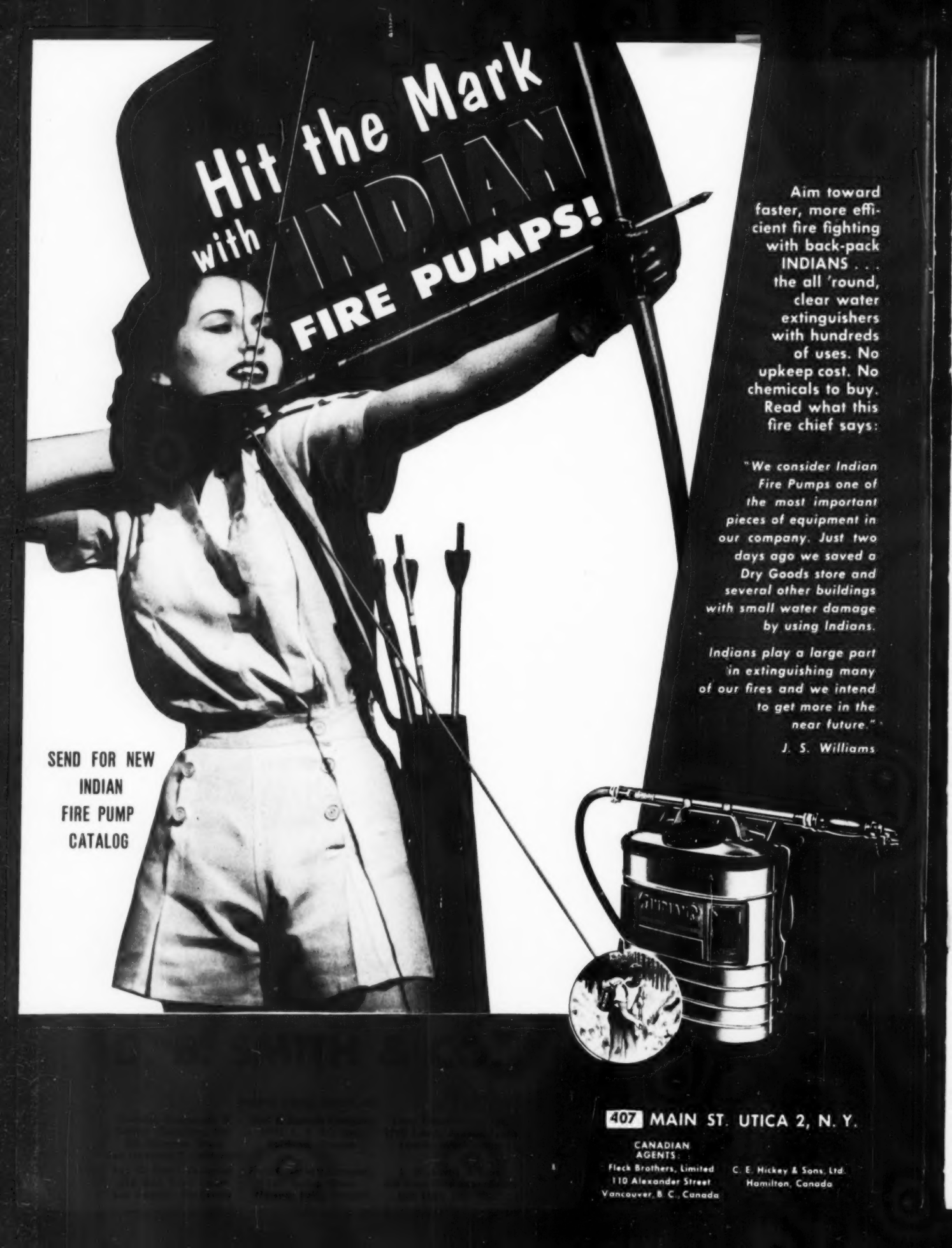
FORESTRY

APRIL 1953



SOCIETY OF AMERICAN FORESTERS 1900

Volume 51
Number 4


Hit the Mark
with INDIAN
FIRE PUMPS!
Aim toward faster, more efficient fire fighting with back-pack INDIANS . . . the all 'round, clear water extinguishers with hundreds of uses. No upkeep cost. No chemicals to buy. Read what this fire chief says:
"We consider Indian Fire Pumps one of the most important pieces of equipment in our company. Just two days ago we saved a Dry Goods store and several other buildings with small water damage by using Indians.
Indians play a large part in extinguishing many of our fires and we intend to get more in the near future."
J. S. Williams
SEND FOR NEW INDIAN FIRE PUMP CATALOG
407 MAIN ST. UTICA 2, N. Y.
CANADIAN AGENTS:
Fleck Brothers, Limited
110 Alexander Street
Vancouver, B. C., Canada
C. E. Hickey & Sons, Ltd.
Hamilton, Canada

VOLUME 51 ● NUMBER 4 APRIL 1953

Journal of Forestry

Editorial Staff

ARTHUR B. MEYER ..... *Editor*
HENRY CLEPPER ..... *Managing Editor*
L. AUDREY WARREN ..... *Business Manager*

Associate Editors

HAROLD H. BISWELL, *Range Management*, School of Forestry, University of California, Berkeley 4, Calif.

C. FRANK BROCKMAN, *Forest Recreation*, College of Forestry, University of Washington, Seattle 5, Wash.

CHARLES C. BUCK, *Forest Fire*, California Forest and Range Experiment Station, P.O. Box 245, Berkeley 1, Calif.

S. R. GEVORKIANTZ, *Mensuration*, Lake States Forest Experiment Station, University Farm, St. Paul 1, Minn.

CLARENCE W. RICHEN, *Forest Management and Engineering*, Crown Zellerbach Corporation, Public Service Building, Portland 4, Oreg.

HARVEY J. MACALONEY, *Forest Pathology and Entomology*, Forest Insect Laboratory, 628 E. Michigan Street, Milwaukee 2, Wis.

RALPH W. MARQUIS, *Forest Economics and Policy*, Northeastern Forest Experiment Station, 102 Motors Avenue, Upper Darby, Pa.

HERBERT B. MCKEAN, *Forest and Wood Utilization*, Timber Engineering Company, 1319 18th Street N. W., Washington 6, D. C.

CARL E. OSTROM, *Silviculture*, Southeastern Forest Experiment Station, 223 Federal Building, Asheville, N. C.

H. G. WILM, *Forest Influences and Soils*, Forest Service, U. S. Department of Agriculture, Washington 25, D. C.

LEE E. YEAGER, *Forest-Wildlife Management*, Colorado Cooperative Wildlife Research Unit, 243 Forestry Building, Colorado A & M College, Fort Collins, Colo.

LLOYD THORPE, *Advertising Representative*, 604 Medical Arts Building, Seattle 1, Wash.

The JOURNAL OF FORESTRY, established in 1917, is the official organ of the Society of American Foresters, but the Society assumes no responsibility for the statements and opinions expressed by contributors.

Publication office, 825 Mills Building, 17th Street at Pennsylvania Avenue N. W., Washington 6, D. C. Address all correspondence concerning editorial or business matters to JOURNAL OF FORESTRY, 825 Mills Building, 17th Street at Pennsylvania Avenue N. W., Washington 6, D. C. Published monthly. Subscriptions $7.50 per year; single copies 75 cents. Missing numbers will be replaced without charge provided claim is made within thirty days after date of the following issue.

The editors are not responsible for loss or damage of manuscripts and photographs while in transit or in their possession. All material submitted for publication should be accompanied by return postage.

Copyright, 1953, by the Society of American Foresters.

Entered as second-class matter at the post office at Washington, D. C. Acceptance for mailing at the special rate of postage provided for in the Act of February 28, 1925, embodied in Paragraph 4, Section 412, P. L. and R., authorized November 10, 1927.

CONTENTS

COVER: Forester W. W. Clingan and farmer Arvid Saik of New York discussing woodland management. See page 269.
Photo by Leland J. Prater.

Poisonous Snakes of America — *David A. DaLie* 243

Forest Grazing in the United States — 248
Walt L. Dutton

Forest Soils: Perspective and Prospects and Comments — 252
S. A. Wilde, Stanley P. Gessel, and *T. S. Coile*

Statistics from Schools of Forestry for 1952: Degrees Granted and Enrollments — 256
Gordon D. Marckworth

Administrative Management at the Grass Roots 260
James A. Egan

My Observations of Israel's Conservation Program — *J. J. Levison* 266

Procedures for Analyzing Small Woodlands — 269
L. O. Grapp

Ponderosa Pine Plantation Pruning — 275
A. R. Liddicoet, E. F. Kimbrough, and *E. J. Carpender*

Geography of Commercially Important United States Trees — *William A. Dayton* 276

Production and Quality of Pond Pine Seed in a Pocosin Area of North Carolina — 280
Clemens M. Kaufman and *Henry G. Posey*

The Periodic Inventory in Forest Management —A Specific Example — *Walter H. Meyer* 283

Notes — 287
The Relation of Growth to Severity and Season of Pruning Open Grown Loblolly Pine; Volume Tables for Stumps; Two Stage Falling in an Overmature Stand; Hurricane Break in New England Conifers.

Points of View — 291
Comments on Review of *Forestry in Japan 1945-1951*; More on the Use of Aircraft in Checking Forest Photo-Interpretation, and Comments.

Reviews — 294
Logging Mechanization in the U.S.S.R.; The Timber Supply Situation in Florida; Trees, Shrubs, and Flowers to Know in British Columbia; Forest Planting Possibilities on Indiana Coal Stripped Lands; Son of the Forest; British Commonwealth Forest Terminology—Part I; 382 Photomicrographs of 91 Papermaking Fibers.

Current Literature — 298

Society Affairs — 299

Forestry News — 310

NOW YOU CAN HAVE THIS

COMPLETELY HANDY, READY-REFERENCE

Forester's Catalog

Here is the new 1953 edition of the catalog foresters and other outdoor people have been waiting for.

All Types of Supplies for Foresters, Timber Growers, Engineers and Outdoor People

You will enjoy browsing through this new 1953 catalog. It lists many practical items to help you in both woods and office work. Catalog is illustrated throughout and all prices are shown. We have many satisfied customers all over America. Join them now by letting us help YOU with all your forestry needs.

FREE! Mail Coupon For Your Copy TODAY!

FORESTRY SUPPLIERS INCORPORATED

132 Raymond Road, Battlefield Station
Jackson, Mississippi, Dept. 102

Please rush me your new 1953 catalog.

NAME _____

ADDRESS _____

_____

PRUNING FOR PROFIT

Bartlett Mfg. Co. now have a new item to offer in the M-414 MEYLAN PRUNING SAW which consists of the use of an axe handle with the Bartlett No. 44 Pole Saw Head except that a special blade of heavier tool steel is used and can be furnished in either 16" or 18" length. The axe handle, which is especially made for this saw is properly tapered to fit the head and is 36" long.

Because the Meylan Saw will enable a man of average height to prune 9½ ft. from the ground, it has made a saving in pruning coniferous plantations as great as 25%.

The Saws are available for prompt shipment, delivered to any address in U.S.A. at the following prices.

M-414 Meylan Saw, complete with 16" blade..... $11.60

M-414 Meylan Saw, complete with 18" blade..... $12.00

BARTLETT No. 114B PRUNING SAW

Streamlined, speedy-cutting pruning saw with big, husky teeth that cut full length of blade. No other saw compares with it for speed, efficiency and ease of filing. No special gauges required.

114B—Special Utility Saw
Delivered $6.25

Bartlett Mfg. Co.
Box 15, 3003 E. Grand Boulevard
Detroit 2, Mich.

Journal of Forestry

Official Organ of the Society of American Foresters

Poisonous Snakes of America

David A. DaLie
Naturalist and Wildlife Director, Okefenokee Swamp Park, Waycross, Ga.

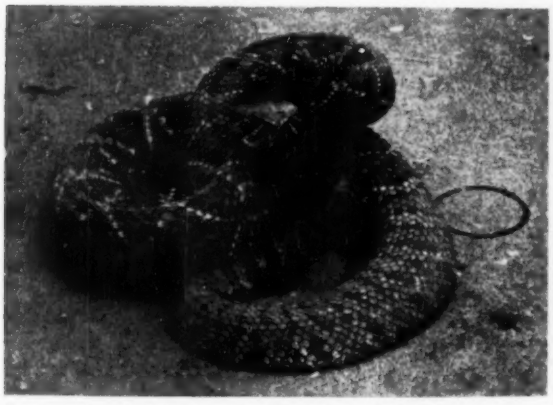


FIG. 1.—A coiled Eastern diamondback rattlesnake.

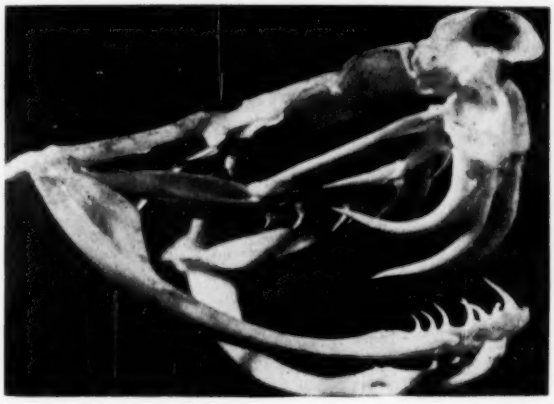


FIG. 2.—Skeleton of head of Eastern diamondback rattlesnake.

AN ATTEMPT to set forth an intelligent and comprehensive treatise on snakes to answer the needs of the average field man, without being over-scientific and repetitious, is a rather delicate task. It can probably be most satisfactorily performed by rendering information that is pertinent only to accurate recognition of the most dangerous species in their native habitat, their reactions upon human contact, and concise, sensible first-aid measures in case of a bite.

Not all outdoor workers have the time to devote to the study of reptiles. Therefore, a condensed summary of important points regarding man's relation to snakes may be of practical use.

There are some phases that cannot be explained except through use of rather involved scientific terms but I will avoid them when possible. For example, the composition and reaction of snake venom in the human body cannot be adequately covered without use of a few technical terms. However, the average reader interested in this information will probably possess sufficient basic knowledge of the subject, so that technical terms will prove no barrier.

Economic and Biological Value

First of all, it is important that we understand the position of the serpent in nature and what his functions are in preserving nature's balance.

Only a little serious consideration is necessary to reach the conclusion that a snake could not possibly be interested in humans as food because even his limited instincts inform him that a man is much too large to swallow. The obvious answer to a snake's belligerent attitude is self-defense, and he does not seek this situation; it is thrust upon him. A snake's defense weapons are bluff, flight, or (for the venomous species) striking with the poison apparatus. Being a creature of instinctive habit he will use the mode of defense provided by nature to the best of his ability, often with fatal results for the aggressor.

This is a good opportunity to interpolate a fact that is astounding to a great many people unfamiliar with snakes. There are no snakes in this country that will deliberately attack a man. There are a few that, when cornered, will press home a vicious strike by crawling a foot or two nearer, but that is the extent of a snake's voluntary aggressiveness. A frantic effort to get away is often confused as an attack. I have had cornered coachwhips and racers fly directly at my face when all other avenues of escape were cut off, or when the snakes thought they were cut off. This was sheer desperation on the part of the snake and a last resort to reach safety.

A snake has a definite economic and biological value. This is particularly true of such species as the various rat snakes, king snakes, and racers. They devour annually huge numbers of harmful rodents that otherwise would make terrific inroads on the profits of the agriculturist. It is estimated that a single western bull snake in a normal sea-

son will attack and destroy from 12 to 36 field rats and pocket gophers. There may be about a dozen gophers to an acre of grain and they may cost the farmer approximately five dollars per acre per season, not a small figure when one realizes that some grain farmers cultivate thousands of acres annually. Obviously, one snake to about every two acres would solve the problem, but unfortunately many farmers are not aware of the beneficial value of snakes hence these innocuous and helpful creatures are still slaughtered ruthlessly. The same fate generally befalls the rat snake or milk snake found prowling around human habitations. He is there to make a meal of the rats and mice, but much darker motives are attributed to him and as a result he will probably be beaten to a pulp by some rustic "hero" who imagines he is performing a great service to humanity.

As to the often unappreciated service the snake performs daily, a bit of research will convince even the most skeptical that it is certainly important.

I have no argument with those who declare that poisonous species should be exterminated near human habitations, but we should distinguish between friend and foe in the snake world and not kill all snakes indiscriminately. Much wanton destruction is due entirely to ignorance, in most cases; and all woodsmen and scientists should aid in the preservation of non-poisonous species before our important reptile life is eradicated to the point where it will cause a definite upset in the balance of nature.

There are 132 species and subspecies of snakes east of the Rocky Mountains. Only 20 of these are venomous. The larger poisonous snakes are definitely dangerous to hunters and outdoorsmen but, nevertheless, a snake bite is a rather rare occurrence. It is on the bottom of the list of insurance company hazards and some do not bother to list it at all.

Therefore, unless you are a snake hunter, lecturer, or herpetologist who handles snakes daily as a part of your normal activity, your chances of being bitten by a poisonous snake are very slight, and you will probably live to old age without suffering this unique and unpleasant experience.

Four Poisonous Types

There are only two types of poisonous snakes in the United States: the *Crotalidae* or pit vipers, represented by the copperhead, the water moccasin and the rattlers; and the *Elapidae*, represented by the coral snakes.

The pit vipers (*Crotalidae*) are so called because of the small hole or pit located between nostril and eye.

There are over 30 forms of the rattlesnakes alone; however, since any serpent with a "rattle" on its tail is a rattlesnake, identification of this type is a simple matter.

The cottonmouth water moccasin is unique in being the only poisonous water snake in the United States. All the other so-called "moccasins" are non-poisonous water snakes, although some are as large as the moccasin, look just as forbidding, and inhabit the same terrain.

The copperhead has four forms with not too much difference in appearance evident to the layman. In fact, where the ranges overlap interbreeding has blended these serpents until it is a problem for the experienced herpetologist to classify the specimen at hand.

The last type, the coral snake, is not a pit viper, but is directly allied to the Old World cobra and carries the same type of venom. Its venom works on the nerve centers, and is extremely deadly. There are four forms, but two of these have very limited ranges—the state of Arizona and the southernmost tip of Florida respectively.

There is at least one kind of poisonous snake in practically every state in the Union. They are remarkably tenacious, considering their persecution and the advancement of industry and agriculture which is slowly destroying the habitat necessary for their survival. Copperheads are still found along the Palisades of the Hudson and small rattlers within fifty miles of Chicago.

Geographic range is a complicated matter and we will deal here only with the more common and abundant species really dangerous to man. Rattlers of the large type are found throughout the West in more or less abundance. The formidable eastern diamondback inhabits the Coastal Plain region of the Southeast. The prairie rattler is represented in the Central Plain region, and the northern timbered areas have plenty of timber rattlers. The moccasin extends from Florida to Virginia and west to Texas. The copperheads inhabit almost the entire area east of the Mississippi river with varieties extending into Texas and the plains, and the common coral is found in most of the southeastern states.

Before we go on to the discussion of individual characteristics of our larger and more formidable serpents, Table 1 will be found helpful in furnishing data on range, size, food, coloration, and number in litter at birth. This latter information will also provide a clue as to why most snakes have managed to survive in spite of the most adverse conditions. Their fecundity is far superior to that of most of the higher forms of vertebrate life and each snakeling fends for itself at birth.

The Rattlers

The eastern and western diamondback rattlers are the largest and most dangerous snakes in this country. A greater number of bites occur from the western variety because of its extensive range and habit of foraging in fairly open country. Moreover, the western diamondback is more ill-tempered than the eastern, and will not hesitate to strike viciously again and again. This is one serpent that will inch forward while striking, with the intention of getting close enough for a successful bite. During eight years of handling hundreds of eastern diamondbacks, I have never known one to show this trait of his western relation. The western species causes great loss to ranchers each year as this is a large

Table 1.—Data on Important Poisonous Snakes

Species	Range	Coloration	Maximum size	Food	Number of young
Eastern diamondback rattler (Crotalus adamanteus)	Fla., Ala., Ga., Miss., N. C., S. C.	Dark diamonds with light centers on dark olive background.	8 ft.	Rabbits, rats, birds.	10 to 20
Western diamondback rattler (Crotalus atrox)	Ariz., Ark., N. Mex., Calif., Texas, Okla.	Brown diamonds on buff gray background.	7 ft.	Rats, rabbits, gophers.	5 to 25
Timber rattler (Crotalus horridus)	Ark., Iowa, Kan., Minn. Mo., Nebr., Okla., Wis. Practically all states east of Miss. River.	Dark V shaped cross bands on yellowish brown ground color. Also there is a black phase.	5 ft.	Mice, squirrels, shrews, birds, rats.	6 to 18
Prairie rattler (Crotalus viridis)	Ariz., Colo., Iowa, Idaho, Kan., Mont., Nebr., N. Mex., N. & S. Dak., Okla., Tex., Utah, Wyo.	Dark rounded blotches on greenish gray background.	5 ft.	Mice, rats, gophers, small rodents.	5 to 20
Cottonmouth moccasin (Agkistrodon piscivorus)	Fla., north to Va., and west to Texas.	Dark wide cross bands on olive brown ground color.	5½ ft.	Frogs, birds, lizards, small turtles.	5 to 15
Copperhead (Agkistrodon mokasen)	Practically all the Southeast to Texas, north to Md.	Bright coppery markings, to chestnut brown cross bands on lighter coppery background.	4 ft.	Mice, birds, insects.	5 to 10
Coral snake (Micrurus fulvius)	Southeastern states. One species in Ariz.	Exceedingly bright. Red, black and yellow rings completely encircling the body.	Around 3½ ft.	Lizards, insects, salamanders.	Not known

snake with ample poison apparatus to inflict a fatal bite even on an animal as large as a cow or horse. In many parts of its range a bounty is paid for its destruction.

The eastern diamondback, on the average is the largest poisonous snake of the country. It may reach a length of eight feet, with corresponding body bulk. Its fangs may measure one inch long, and it carries enough venom to inject as much as 250 milligrams at one bite. This is enough to kill several people, so it is readily apparent that this big snake is a worthy antagonist. Anyone, who has ever met up with one of these fellows in the woods, invariably speaks of the experience with awe. They seem to possess great dignity and will coil up and await developments, rattles buzzing ominously, alert to your every move. This magnificent reptile is doomed to gradual extinction, however, as hundreds are captured each year to furnish specimens to zoos, showmen, and exhibits. Once plentiful, they are becoming scarce over a large part of their range.

The prairie rattler, a prolific breeder of medium size, is found in large numbers throughout the Great Plains. There are six subspecies, but this is of little interest to the layman. The various types range from three to five feet, and all display a timid disposition. They will not fight unless cornered. These snakes get together in great numbers for hibernation and are often destroyed en mass when someone discovers their den.

The timber rattler and his close relation, the canebrake rattler, inhabit forested country where there are rock outcroppings suitable for for denning purposes and dense cane and sedge concentrations along river bottoms. When walking through such territory one should keep a wary eye open for these snakes as they have a tendency to remain perfectly still and quiet unless stepped on or disturbed at extremely close range. They both grow to large proportions and can inflict a deadly bite.

The Cottonmouth

The cottonmouth moccasin, which prefers the quiet backwaters of the southeastern states, is as previously mentioned the only poisonous water snake in the United States. I have become familiar with them during several years of intimate contact with the extensive wilderness areas of the Okefenokee Swamp, and have taken advantage of the unusual opportunities to observe and study them. The cottonmouth is a heavy-bodied snake and in general is lethargic and peaceful. He must be subjected to extreme annoyance before he becomes aroused. He will then open and close his mouth, exposing the white interior which gives rise to his common name. He also is called the "gapper" for this reason.

A cottonmouth can inject a large amount of venom and some experts consider it more lethal than the rattler's poison. Its fangs are not as long as those of the rattler, but it has a nasty habit, when biting, of chewing on the offending object for some time, sinking the fangs deeply at each effort. This snake has a broad triangular head with two whitish stripes on each side of the cheek that are readily discernable at a distance. It can be identified by the eliptical eye pupil, which is typical of all our poisonous serpents except the coral snake.

The Copperheads

The copperheads are well distributed throughout the eastern

United States, and frequent the same type of territory as the timber rattlers, as well as lower terrain. It is not an aggressive snake, preferring to remain quiet and unnoticed, or given to flight if discovered. When cornered it displays great courage and will strike viciously with short lightning-like strokes. It is readily identified by its bright coppery color. When lying among dry leaves it often vibrates the tail rapidly, making a sound not unlike a small rattler.

It prefers rocky ground with many crevices and fissures in which to hide. One should be especially careful when negotiating territory of this type. Often bites from the copperhead are received on the upper limbs and shoulders, caused by the carelessness of hikers who, when climbing over rough shelving, do not take the precaution of appraising the spot they grasp for a hand hold. When surprised or touched the copperhead strikes swiftly and with no warning.

The bite of this snake can be serious, particularly to a child, and should receive the same care and consideration as a bite from the larger rattlers. Although many adults have recovered without aid, it is extremely painful and usually results in deformity as large amounts of flesh slough off around the immediate site of the bite, due to necrosis.

The Coral Snake

Our last important representative is the beautiful and deadly coral snake, another species I have had ample opportunity to observe in the environs of the primeval Okefenokee. This snake is shy and retiring, spending most of its time in seclusion, buried in soft loamy soil or under the bark of fallen trees where it finds the insects and small lizards that make up the greater part of its diet.

The coral is our only poisonous snake that is predominently neurotoxic. Fortunately, bites from the coral are rare. They have tiny, fixed (immovable) fangs, and they do not bite by striking. The fangs are located toward the rear of the mouth, and they must hang on and chew in order to get the venom into the wound.

I have had the dubious thrill of pulling a coral snake loose many times from my fingers, before it had sufficient time to pierce the skin. This always happened when the little reptile became irritated from excessive handling during lectures. There is no reason for anyone to be bitten by a coral snake unless he picks it up and handles it.

It is brightly colored and easily identified, as explained in the accompanying chart. Its nose is always black, distinguishing it from many harmless, similarly colored mimics such as the scarlet king snake which has a red nose. (This statement holds true only in the United States, as there are poisonous snakes with red noses in the Tropics.)

The little coral should be accorded every respect. If it does bite, the polyvalent anti-venin kit for the pit vipers is useless and the bite may well prove fatal.

Simple Precautions

A few simple, basic precautions in the field will serve to reduce snake bite as a serious hazard. Alertness while walking through thick cover or traversing rocky ground will usually enable you to see a snake in plenty of time to avoid him. Remember that for every snake you see, there are a hundred that disappear when they hear your noisy passage through the brush. I have stood within striking distance of large rattlers many times, but because they were adequately concealed they made no sound or hostile move. Only close scrutiny later disclosed their presence. When they sense that you are aware of them they become alert and assume an attitude of defense. As they hunt for their food mostly at night, they may sometimes come to the vicinity of camp in the darkness, attracted there by the mice and rats which are taking the crumbs from the campers larder.

An effective temporary legging may be made by wrapping newspapers around the legs with string or rubber bands. Ordinary leather boots are protection from bites of all but the large rattlers which occasionally strike above a boot top or manage to pierce thin leather. A thick cowhide boot will furnish complete protection from the standpoint of penetration, but it should always be borne in mind that extreme wariness is your best asset as a large snake could be coiled at a high spot and strike as high as your hip.

The Venom

The mechanics of a poisonous snake's venom apparatus is one of the most ingenious accomplishments of nature. It is a natural hypodermic needle with the duct leading from the fang to the venom gland. When the snake strikes flesh he compresses the gland and the venom is injected into the wound. A snake can strike, bite, and recover in less than two seconds.

The venom is a clear, thick fluid, often yellowish in color, containing cast off epithelial cells, special proteides, and a large number of toxic substances that act on the tissues and organs of the body. It is a very complex product and has never yielded to direct analysis. Most of our knowledge of it comes from observation of its effects. We know that it is unaffected by cold or the passage of time, but heat destroys its potency.

It is tasteless, odorless, and can be swallowed without harmful results as the stomach acids evidently neutralize it. I have performed this experiment countless times without ill effects. But if one has an open stomach ulcer, or sore in the mouth, he can be poisoned. It starts its toxic action only when introduced directly into the blood stream.

One of its chief constituents is haemorrhagin which breaks down the circulatory vessels and destroys blood cells. It also causes thrombosis and attacks the vasomotor nerves causing difficulty in breathing. Death usually is caused by circulatory collapse.

Coral snake venom works chiefly on the nerve ganglia, as one of its

properties is a special affinity for nerve cells. This effect is gradual paralysis; the victim expires because he cannot breathe. Therefore this type venom is known as "neurotoxic" and the pit viper venom as "hemotoxic."

When dried, venom is reduced to an amber-colored crystalline powder that is readily soluble in water or a weak saline solution. In recent years wonderful strides have been made by medical science in utilizing snake venoms for the relief of human ills. A derivative of moccasin venom has been found to be efficacious in the relief of some forms of rheumatism and arthritis. Great quantities of venom are used annually in the production of anti-venin kits for the counteraction of snake bites. Russell viper poison derivative has been used to check severe bleeding and the king cobra's venom to relieve the terrible pain of cancer. This is another way in which the maligned serpent contributes to the benefit of mankind.

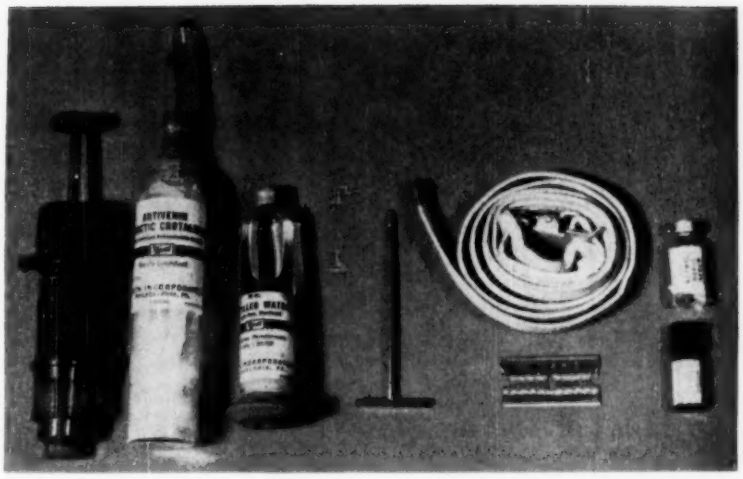


Fig. 3.—Disassembled snake bite kit, showng simple suction cup; vacuum vial to yield 15 cc. of reconstructedserum ; syringe containing 15 cc. of distilled water; plunger; tape tourniquet; razor blade; one cc. vial of normal horse serum for test; first aid ampule of iodoine solution.

First Aid

Two of the greatest hazards accompanying snake bite are ignorance of what to do, and blind panic which may render the stricken person ineffectual in applying the knowledge he does possess.

First aid treatment is actually simple, but it is well to bear in mind that it is also very important since first aid can remove as much as forty percent of the venom—a big advantage in the direction of complete recovery. In a child the bite is very dangerous because of greater venom ratio to a smaller blood volume.

Your chances of recovery from snake bites are excellent if you know what to do, and do it. The rapidity with which you recover and the serious effects of the bite depend on a number of factors: your age, physical condition, location of bite, size of the snake and amount of venom introduced, and the promptness and effectiveness of properly administered first aid treatment.

The cardinal rule is to remain calm at all costs. Remember, you have time to treat yourself, as in most cases several hours must elapse before it is too late to save a victim. Even then, many so-called hopeless cases are saved by repeated injections of anti-venin. The danger is undertreatment.

I recommend the following first aid procedure:

1. Be sure the snake is actually poisonous. An intense, painful, burning sensation and rapid swelling and discoloration at the site of the bite will confirm this. The poisonous snake will leave two small fang punctures. If nonpoisonous, a double row of needle-like pricks that usually bleed profusely will be present, and no pain or swelling will develop. Any common antiseptic such as iodine or methiolate will effectively cauterize a harmless bite; the only danger is infection as from any other cut or scratch.

2. When you know the symptoms denote a poisonous bite (they will be evident in less than five minutes) begin actual first aid immediately. Apply a tourniquet between the bite and the heart; not too tight. It must restrict the flow of blood, but not cut it off completely. The tourniquet should be loosened about 30 seconds of every 10 minutes to prevent gangrene. As the swelling advances, keep moving the tourniquet ahead of it.

3. Take a sharp, clean knife or razor blade and make two or three shallow cuts over each fang mark, about a quarter of an inch deep, being careful not to cut into a large artery or vein. Apply the mouth as suction if necessary and possible. As you get a mouthful of venom and blood, spit it out and resume immediate suction. This should be kept up continually until you reach professional medical aid. If you have a first aid kit, use the suction bulb in the same way. This is the only answer if the bite is on the lower limb, unless a companion will apply suction by mouth for you.

4. Do not run or exercise in any way that will increase circulation. This speeds the venom through your body. Remain quiet and let some one else drive you to the nearest physician. If you are on foot, Walk, Do Not Run.

5. Do not take alcoholic stimulants. They only make conditions worse. The alcohol distends the blood vessels and makes the passage of the poison that much easier. When you reach the doctor or hospital you will be given anti-venin in proper dosage and the worst is over.

Do not allow people to apply dubious home treatments. Many of these procedures do more harm than good. Never let anyone minimize the danger of any poisonous

snake bite. Apply first aid to the best of your ability and get to competent medical aid as quickly as possible.

Antivenin Kits

If you are going to be isolated in country where you are great distances from help, you will want to carry at least two antivenin kits with you. This boon to man is manufactured by Wyeth, Inc., 1600 Arch Street, Philadelphia, Pa. It is technically known as "(Nearctic Crotalidae Polyvalent) North American Antisnakebite Serum." Its cost is nominal and it is obtainable at any drug house or your local pharmacist can order it for you. Complete simplified instructions for administering it are furnished in every package.

In addition, the following snake bite kits have been used and endorsed by experts. I have personally tested them and have found them simple and effective, with powerful suction apparatus, which is of prime importance in every first aid kit for snake bite.

MSA Snake Bite Kit, Mine Safety Appliance Company, Pittsburgh 8, Pa.

Halco Snake Bite Kit, A. E. Halperin Company, Inc., 75 Northampton Street, Boston, Mass.

Vac-Viper Car Kit, William E. McCreary, Box 633, Tampa, Fla. This kit attaches to the windshield wiper vacuum system of any motor vehicle, and is exceptionally powerful in its suction action.

Forest Grazing in the United States[1]

Walt L. Dutton

Chief, Division of Range Management, U. S. Forest Service, Washington, D. C.

AT THE TURN of the century most foresters in the United States had little sympathy for grazing. For the most part their interest was a negative one, or in some cases openly hostile. Grazing was considered to be generally destructive of tree reproduction. Foresters held that within its own domain forestry was a self sufficient land use. All too often they overlooked or submerged multiple purpose management. At least they did not regard it as an important responsibility of professional foresters.

We have come a long way during the past fifty years. The original narrow concept has been discarded as having no place in a broad forestry program. It is now generally recognized that forested lands whether federal, state or privately owned, contribute to national needs, not only for timber but also for water, grazing, recreation and wildlife. Most areas of forested lands support at least two of these values and many support all of them. Management must take into account the relationship of one to the other and provide for the correction of any unnecessary conflicts.

It is the purpose of this paper to sketch briefly the place of range management as it relates to forestry in the United States, and to point out a few problems where mutual interest requires a joint and sustained effort for their satisfactory solution. Any discussion of forest grazing in a country as large and varied as ours must take into account the extensive areas of forest range which are radically different as to climate, forest types, agricultural economy, range problems and management practices.

In the United States over half of our total land area, or over 950 million acres, is classed as range. These lands furnish forage for one-half of our cattle and three-fourths of our sheep during some part of the year, and also provides a home for wildlife, especially deer, elk and antelope. Over one-third of this area is forested, including both commercial and non-commercial forest lands, and is grazed by livestock and game. For purposes of convenience, I will discuss these under the headings of forest grazing in the Northeast, South and the West.

[1]Paper presented at the Joint S.A.F.-C.I.F. Meeting, Montreal, Canada, Nov. 1952.

Forest Grazing in the Northeast

Forest grazing in the Northeast extends from the Missouri Ozarks to the central and eastern States' hardwoods. There are about 42 million acres of forested land used for grazing purposes. The range livestock industry in this area is confined largely to farm woodlots and openings within the forest and is not important in the national range picture. However, in many local communities the grazing of beef cattle and sheep is extremely important. For example, beef cattle and sheep production ranks first in importance agriculturally in many of the eastern counties of West Virginia. Most of these animals are grown on intensively managed pastures.

In much of the Missouri Ozarks there is a direct conflict between grazing use and timber production, largely resulting from improper forest and range practices. Most of this area is capable of producing several fold of both timber and forage of what it is now supporting. There is a need for a coordinated program of land management wherein timber stands and forage yields are improved by the

elimination of non-commercial tree species, improved harvesting methods, and conservative use of the forage in summer months when grazing is least injurious to tree reproduction *(12)*.

In this hardwood region, silviculturists generally have taken a dim view of grazing and have urged removal of livestock from the woods. The main conclusion from a study of woods grazing in Indiana was that the woods need continuous protection from grazing in order that adequate tree reproduction may become established *(9)*. It is possible that future experience and research will show that such damage may be avoided by proper stocking and the adoption of suitable grazing periods. Until this information is forthcoming it may well be necessary to confine grazing use of livestock largely to the openings within the forests. Such openings are generally ecologically unnatural, having been created years ago by clearing the forest for farming. Generally, they can be made very productive for grazing, but often require intensive liming and fertilizing. Strange as it may seem, close grazing is necessary to eliminate the tough, wiry native grasses and encourage their replacement by more desirable pasture species such as Kentucky blue grass and white clover. Such openings are needed by the forester for their firebreak value. Furthermore, these openings are a must for increasing and maintaining deer and upland game bird populations. Hence the development and exploitation of openings within these eastern hardwood forests can be made to serve the objectives of the forester and wildlife manager as well as that of the range manager.

Forest Grazing in the South

Forest range grazing in the South is a large and growing industry, involving about 140 million acres. Of this area the southern coastal plain is by far the most important livestock area *(5)*, extending from East Texas to Virginia, with some 100 million acres of longleaf-slash pine, shortleaf-loblolly pine, hardwoods and bottom land hardwoods. The forests are relatively open and produce a fair amount of forage, including grasses, sedges and legumes. Climate is mild and precipitation ranges from 45 to 60 inches annually. A substantial part of the 7½ million cattle, one million sheep, and an estimated 3½ million hogs are dependent on forest range. Much of the South in years past has been characterized by low quality livestock, but improvement in quality is on the distinct upswing. Increased forage and feed supplies, a better understanding of managing forest range, the control of insect pests, and better provision for animal nutritional requirements, are now encouraging a buildup in animal numbers, particularly cattle. *(7)*.

Range livestock grazing is reported to be a mixed blessing in southern forests *(6)*. Grazing reduces the fire hazard and yields cash returns to an important segment of the southern rural economy. It has caused damage to tree reproduction mainly from hogs and sheep, and under some circumstances from cattle. Uncontrolled range fires have destroyed much timber. In spite of these shortcomings and in recognition of the values and advantages of producing both timber and meat from the same area, research and experience during recent years have shown that integrated management is necessary. As an example, in Louisiana *(1)* forest and range practices provide for protection of the trees. This includes several measures. Construction of firebreaks is first. These should be fertilized and reseeded to choice forage species and closely but not heavily grazed by livestock. Prescribed burning is conducted in order to control brown spot and to stimulate height growth of longleaf pine, to reduce fire hazard from accumulating litter and grass, to reduce competition to trees from the rough, to encourage natural reproduction by providing a mineral seedbed, and to improve grazing and forage production by destroying pine needles and dead rough. Tree planting practices are followed in which the best tree species are selected as adapted to the site. The proper management of livestock is integrated with forest practices. Cattle grazing is preferred and is restricted to late spring and summer use, and numbers must be controlled to prevent damage to pine seedlings and to insure adequate animal nutrition. The herbage in the forests contain sufficient nutrients to support livestock without supplemental feeding only during the spring and early summer months. Supplemental feeding is usually necessary and permanent pastures should be developed for wintering the cattle. Grazing use by hogs is not recommended until at least fifteen years after the establishment of a plantation.

One of the major forest problems in the South is the widespread increase of unmerchantable hardwood trees which overtop and suppress young pines. Research has shown *(8)* that poisoning of these unwanted trees results in the release of pines for rapid growth, and at the same time doubles forage production for 10 to 15 years, or until the new tree canopy again reduces the herbaceous cover. With good management the increased income from grazing will pay a major part of the cost of hardwood control.

Forest Grazing in the West

In our western states we have some 225 million acres of forest land, of which about 70 percent is usable for grazing. About 63 percent of this total is under federal ownership or control. This forest range consists mainly of open stands of ponderosa pine, pinyon-juniper, and oak woodland, with its accompanying grassland and meadow openings. The remainder consists largely of dense stands of spruce, lodge-pole and Douglas fir, which produce very little in the way of forest grazing values. The open forest range lands of the West differ from those of the more humid East and South and pose many problems because of the variable and often droughty climate, soils which may be highly erodible and vegetation that will not withstand close grazing use. Furthermore, in many parts of the western forest

range, use of forage by big game has to be carefully correlated with livestock *(13)*. Superimposed on top of this is the fact that nearly every forest range acre is of importance as watershed, either as a producer of water—precious to the economy of the West—or as a potential producer of debilitating sediment. It is for this reason I think it essential that we consider briefly the history of range decline in the West.

The beginning of forest range deterioration dates back to the late 1880's when livestock numbers reached what was to be for many years an all-time high. This period is known historically as the "beef bonanza." It coincided with the completion of the transcontinental railroads, cessation of Indian wars, and the influx of eastern and foreign capital. Stockmen in those days took the range pretty much for granted, and most of their efforts were bent toward increasing their herds. Proper range management was virtually non-existent. Federal land policies which allowed free and unrestricted grazing provided little or no incentive for a moderate degree of stocking. Actually, it did much to encourage a quick buildup of excessive livestock numbers. Widespread drought and a series of severe winters climaxed with too many livestock on the range and the financial panic of 1893 nearly prostrated the industry.

In 1918 and 1919, high prices and World War I demands for increased food production brought about another great increase in numbers of livestock. In many cases forest range was deliberately overstocked and overgrazed in the mistaken belief that such acts were justified by the emergency. However, the end of the war and attendant drop in market prices left a stranded livestock industry and a still further depleted range resource. In places the damage done has not yet been fully repaired. Fortunately, history did not repeat during World War II, when the Department of Agriculture, aided by far-sighted stockmen ,urged that livestock numbers be kept in balance with feed and forage supplies.

These early day financial losses were unfortunate but of even greater import were the effects of overstocking on the range resource. With the destructive grazing use during the 1880's and 90's and subsequently, the once luxuriant range deteriorated in forage value, undesirable range plants increased and often invaded formerly open grasslands. What was once open savannah and choice grazing grounds became thickened with unwanted trees. Juniper encroached on the open areas. Likewise, mesquite in the Southwest invaded great and extensive areas of grassland. In the mountain areas big sagebrush invaded the higher elevations where it had never grown before. This change in plant cover and deterioration in forage values brought about a situation wherein the cover was inadequate to protect the soil and where infiltration rates were greatly reduced, so that the inevitable took place—destructive floods and excessive sedimentation from accelerated erosion originated from these vast range land acreages.

It is true that grazing and watershed problems on the forested ranges of the West stem largely from excessive stocking combined with the effects of recurrent drought. The open ponderosa pine and aspen areas, because of needle and leaf fall which protect the forest floor, are generally satisfactory as watershed cover even though forage values may be depleted. On the other hand, the meadows and natural openings within the timber type are in varying degrees of deterioration. This has resulted especially on ranges used by cattle which naturally concentrate in such areas. Consequently, it is a prime requisite in observing trends in range condition and judging whether or not our management is satisfactory, that we closely observe what is happening in these openings.

In condemning overgrazing as a cause of accelerated erosion we must not overlook the fact that serious erosion has directly and all too frequently resulted from other causes, including logging, fire, cultivation of land unsuited for farming, improper construction and poor drainage of roads, and various mining activities.

In recognition of the serious erosion that the logging has caused in many areas the forester and the range manager must work together in its prevention. They have done so. For example, in the Pacific Northwest the damage caused by logging can be very serious. In a study conducted in that region *(10)* it was found that tractor logging on ponderosa pine ranges resulted in denuding 21 percent of the herbaceous and shrubby cover of vegetation, covered 5 percent or more of the area with slash and resulted in deep soil disturbance on 15 percent of the area. In recognition of this serious problem foresters and range managers in the Northwest have teamed together in seeding these areas. Immediately after logging, skid trails and logging roads and landings are reseeded to perennial grasses as a means of stabilizing the soil, preventing invasion of undesirable plants and increasing forage production *(11)*. Elsewhere, some silviculturists have expressed concern over this planting of skid trails to grass in that it might prevent the establishment of tree seedlings. Actually, there is little basis for this concern. Furthermore, it is easier and more sensible to plant a tree seedling where the grass has held the soil in place than to transport soil up onto the mountain top in order to plant trees as has been done in some European countries.

In years past, the forester has looked upon grazing in many parts of the West as a means of reducing the fire hazard. This is true up to a point in that the amount of fuel is reduced, and in some areas overgrazing may cause a very marked reduction in hazard, but it has attendant drawbacks including its deleterious effect on the watershed. At the same time overgrazing may and often does increase the fire hazard by bringing about the invasion of highly inflammable species such as cheat grass.

In the ponderosa pine type foresters in years past expressed con-

cern over the injury to pine seedlings caused by the browsing of cattle and sheep. Such browsing is only of consequence where the area is overgrazed. Damage has occurred mostly in early spring or late fall when more succulent types of forage are scarce. This is especially true in the Southwest. On the other hand some of our most successful naturally reseeded ponderosa pine stands have resulted in areas which were initially heavily grazed by livestock, exposing the mineral soil as a seed bed. *(1* and *11)*. Once pine seedlings became established and grow into acceptable stands of reproduction the result is a crowding out of the forage plants through shade, accumulation of litter, and competition for moisture. This is unfortunate to the interests of grazing but is as it should be on lands where timber is of primary value. In many cases, however, it has meant the closing in of openings within the forest, valuable not only for grazing but as natural firebreaks. It would seem sound land management to keep these openings in grass and maintain them as firebreaks for protection of adjacent forest lands. After all, grazing, if properly conducted, may be a distinct aid to timber production. On most forest ranges in the West it is believed that grazing can be fitted into timber harvesting and both can be carried out successfully together on the same area.

Summary

It is believed that forest grazing can in most instances be successfully integrated with other land uses. General adoption of better forest and range management practices and the energetic following through of improvement programs, such as fencing, noxious plant control, control of low value tree species and other improvement practices is considered to be necessary to the realization of a sound land use program. All land values, including water, timber, range, wildlife, and recreation must be carefully weighed and appraised. But multiple land use must be coordinated and integrated. In some instances one or more uses may play a minor role or if necessary may even be excluded in, so far as local or regional demands may require.

Literature Cited

1. Arnold, Joseph F. 1950. Changes in ponderosa pine bunchgrass ranges in northern Arizona resulting from pine revegetation and grazing. Jour. Forestry 48 (2); 118-126.
2. Biswell, H. H. and J. E Foster. 1942. Forest grazing and beef cattle production in the coastal plain of North Carolina. North Carolina Agr. Exp. Sta. Bull. No. 334.
3. Biswell, H. H., B. L. Southwell, J. W. Stevenson and W. O. Shepherd. 1942. Forest grazing and beef cattle production in the coastal plain of Georgia. Univ. of Georgia. Circ. 8.
4. Bond, W. E. and Robert S. Campbell. 1951. Planted pines and cattle grazing. A profitable use of Southwest Louisiana's Cut-Over Pine Land. Louisiana Forestry Commission, Bull. 4.
5. Campbell, R. S. 1947. Forest grazing in the Southern coastal plains. Proceedings Society of American Foresters' Meeting. pp. 262-263.
6. ———. 1948. Forest grazing work in the deep south. Proceedings Society of American Foresters' Meeting. pp. 218-222.
7. ——— and R. R. Rhodes, 1944. Forest grazing in relation to beef cattle production in Louisiana. Louisiana State University Agr. Exp. Sta. Bull. 380.
8. Cassady, J. T. 1952. Grass production doubled by control of scrub oak. Jour. of Forestry 50(6), 462-463.
9. Denuyl, Daniel. 1947. Forest grazing in the central states region. Proceedings Society of American Foresters' Meeting. pp. 255-261.
10. Garrison, George A. and Robert S. Rummell. 1951. First year effects of logging on ponderosa pine forest range lands of Oregon and Washington. Jour. of Forestry 49(10); 708-713.
11. Gjertson, J. O. 1949. Practical guides for seeding grass on skid roads, trails, and landings, following logging on east-side forests of Washington and Oregon. Pacific Northwest For. and Range Exp. Sta. Research Notes No. 49.
12. Hornkohl and Read. 1947. Forest grazing in the Ozarks. Proceedings Society of American Foresters' Meeting. pp. 270-277.
13. Reid, Elbert H. 1947. Forest grazing in the pacific northwest. Proceedings Society of American Foresters' Meeting. pp. 296-302.
14. Rummell, Robert S. 1951. Some effects of livestock grazing on ponderosa pine forest and range in central Washington. Ecology, 32(4); 594-607.

J. Lee Deen Memorial Library

Colleagues and friends of the late Dean Joshua Lee Deen have recommended that Colorado A & M School of Forestry library be named for him as a fitting memorial to his long service in the development of the School of Forestry. It was mainly through his efforts and interest that this library was created and enlarged to its present size.

Plans to increase the library's holdings and to improve the facilities in his memory are being financed by a fund established from donations received since Dean Deen's death.

Those of the many foresters who have been associated with Dean Deen, and who are interested in this effort and wish to contribute to the fund, may send donations to Mrs. Vera Roselieve, Colorado A & M School of Forestry, Fort Collins, Colo.

Forest Soils: Perspective and Prospects

S. A. Wilde

Professor of soils, University of Wisconsin, Madison.

THE SUBJECT OF FOREST SOILS for a long time has been the Cinderella in the family of silvicultural disciplines. In the not too distant past, research in forest soils was conducted not by special research personnel, but by a group of enthusiasts who preferred the moldy odor of wooded grounds and ill-smelling fumes of the laboratory to other forms of the pursuit of happiness. Although forest soil problems attracted many men of talent, for nearly one hunderd years forest soil specialists "boiled in their own juice." They dug pits, analyzed soil samples, and published reports. Meanwhile, practical foresters carried on their long rotation management plans, cut trees, and planted seedlings, paying no attention to soil conditions.

The change in this situation came after World War I, when Germany, Austria-Hungary, and Russia had undergone not only political and social, but also silvicultural revolution. At this time leaders in forestry assembled enough factual information to prove that production of timber cannot be continued successfully without due regard for the natural factors of forest growth, particularly the soil. Consequently, the subject of forest soils was introduced in many forestry schools, and considerable sums were appropriated by various governments for forest soil research. As a result, there were fewer and fewer cases of composts prepared with aluminum sulfate instead of ammonium sulfate, nursery stock buried alive by unbalanced nitrogen treatments, Norway spruce planted on aeolian sands, windfall-terminated selective loggings on hardpan podzols, roads brought to ruin by clear cuttings on lowland gley soils, and many other dramas in the daily life of forest management.

To a certain extent, the interest in forest soil studies was stimulated by the International Congress of Soil Science, held in 1927 in Washington, D. C. In the United States a particularly strong impetus was provided by the enormous reforestation program undertaken as a public works project, beginning in 1933. At present, research and instruction in forest soils in this country have attained a high level.

Perhaps the importance of work accomplished to date by forest soil specialists can be best expressed by the monetary value placed upon their services. Information on file includes offers of $4,000 a year for a forester with a M.S. degree in soils for part-time employment at a well established college. A young forester with a Ph.D. degree in soils is rated as high as $7,500 a year as a teacher and research worker. An experienced forest soils specialist can hope to earn as much as $10,000 a year, and even more in foreign service.

These encouraging statistics should not be interpreted as a measure of the immediate usefulness of available candidates alone; rather they represent a recognition of the collective efforts of all forest soil specialists, both living and dead. However, no medal of honor has only one side; the recognition of achievements imposes new responsibilities which must be squarely faced by forest soil technologists, as well as leaders in silviculture. Among such responsibilities, the problem of instruction deserves particular attention.

Instruction in forest soils is, and probably always will be, conducted on three levels: (1) instruction in the general principles of forest soil science for undergraduate students of forestry; (2) training of forestry graduates in soils, terminating with a M.S. degree and designed to provide technicians for specialized tasks; (3) training in soils leading to a Ph.D. degree and aimed to provide specialists for teaching, research, management, and extension work.

Teaching soils to forestry undergraduates is limited in scope by their unavoidable deficiency of knowledge in analytical chemistry and other subjects pertinent to soil science. This, however, should not prevent students from acquiring an understanding of basic soil-forest relationships important in silviculture.

Today an American forester is expected to work in an enormously wide range of geographic regions, from the subarctic tundra forest to the tropical rain forest. Therefore, an instructor should not fail to stress the climatic-zonal aspects of soil science and avoid the pitfalls of small scale provincialism. Otherwise, primary attention should obviously be given to tasks which foresters are likely to encounter in their daily work. Such tasks include management of nursery soils, handling of fertilizers and biocides, selection of planting sites, survey and appraisal of land, silvicultural cuttings on different soils, and estimation of the potential productivity of soils and probable increment of a forest unit.

All these, however, are technical details which some students will learn and others will not, as is the case with undergraduates. Because of this, the instructor should take full advantage of the hours of his immediate contact with the student body, and during this time unfold to the young men horizons wider than those found in the soil profile. He must impress them with the idea that problems of forest management cannot be solved on the basis of acres and cords alone, and that their solution requires a knowledge of soil conditions and intricate biological relationships.

A task of this kind cannot be accomplished by words and histrionics but rather by a series of well designed exercises and experi-

ments. A few examples of such exercises are as follows: (a) determination of stand volume and growth rate on sample plots located on soils of different productivity, e.g., windblown sand and morainic sand; (b) tally of tree species and heights of dominant trees on a transect strip laid out on a catena including upland soils, deep and shallow gley soils, and peat; (c) quadrat or chain recordings of ground cover vegetation in forest stands on soils of different genesis; (d) analysis of soils in undisturbed and grazed woodlots; (e) application of mineral fertilizers or humate suspensions to pot cultures of rapidly growing seedlings or hybrid poplar cuttings; (f) demonstration of tree development from seed in soils with and without mycorrhizae; (g) effect of addition of raw humus and sodium nitrate on the virulence of damping-off disease; (h) determination of tensile strength of cellulose and protein cords buried for a few days in samples of biologically active and inert humus.

Once the student is reasonably convinced that the growth of forest stands proceeds under the direct influence of soil conditions, he should not fail in his work to regard the forest in its entirety, from the crowns to below the ground line.

The problem of instruction is definitely more complicated in training graduate students.

It usually takes two or more years for a forester to obtain an advanced degree in soils. When a graduate forester considers investing that much time in additional training, he should not forget that the need for forest soil specialists in the field of silviculture is rather limited. Moreover, forestry has a tendency to undergo slack periods during which employment is restricted. Therefore, it is in the interest of every forester entering the field of soils to receive sufficient training which would assure him alternate employment in soils, agronomy, or horticulture. Specifically, a forester with a M.S. degree in soils should be qualified for employment as a soil surveyor, farm planner, drainage technician, plant propagator, or analyst. On the other hand, a forester with a Ph.D. degree in soils should be assured of equal standing with all other graduates in soils and, hence, be capable of working in the broader fields of soil chemistry and plant nutrition.

Suggested Curricula

In order to enlarge their scope of activity and prepare themselves for alternate employment, the candidates should fulfill certain specific requirements. Thus, for a M.S. degree in soils, the candidate should complete the following approximate curriculum: quantative chemical analysis—3 credits; soil analysis—4 credits; soil physics—3 credits; soil and plant nutrition—2 credits; bacteriology—4 credits; soil genesis and classification—3 credits; soil surveys with corresponding field work—3 credits; forest soils—3 credits; seminar, special topics, and research in forest soils—7 credits. In certain cases this should be supplemented by courses in soil conservation, plant physiology, plant pathology, ecology, biometry, or other subjects. On the other hand, if a man entering graduate work in soils possesses a Master's degree in forestry, the schedule naturally will be abbreviated.

The curriculum outlined is sufficient to train a student for certain specific tasks or positions in the field of silviculture, e.g., nursery superintendent, forester in charge of planting site selection or tree planting operations, specialist in erosion control or reclamation of spoil banks, and surveyor entrusted with acquisition or exchange of lands. Judging from current experience, however, there will be slight chance in the future for a man with a M.S. degree to enter research or teaching on the college level.

The candidate for a Ph.D. degree in soils and his major professor, should consider the following additional courses: organic chemistry—3 credits; physical chemistry—3 credits; physical chemistry of soils—3 credits; soil microbiology—3 credits; advanced plant physiology—4 credits; plant nutrition—4 credits; agronomy, including genetics— 6 credits; research in soils—6 credits. Under present day conditions, a reduced curriculum may lead to future disappointments, and the individual in question is likely to find that his doctor's degree is more a social ornament than a professional asset.

The training of forestry graduates in soils would be incomplete if formal instruction were not supplemented by field work in forest nurseries, soil survey, selection of tree planting sites, silvicultural cuttings, and estimates of the rate of forest growth.

It should be admitted in all frankness that many forest soil workers of the older generation entered the profession of soils on a "common law" basis. In days gone by, it was sufficient for a forester to take a couple of special courses, or simply to read a few textbooks, in order to become an "expert" on forest soils. Occasionally, pioneers with this kind of background discovered that even a meager knowledge of a specialized subject paid astonishingly high dividends. This, of course, happened because dilettantes in soil science often found themselves in the fortunate position of "one-eyed kings among the blind." But such days are definitely over; there are no blind men, and there is a steadily growing competition. There is no more chance now to become a soil "expert" by shortcuts than there is to become a violin virtuoso in five easy lessons.

Comments

Stanley P. Gessel

Assistant Professor of Forest Soils, University of Washington, Seattle.

IN PROPOSING a training curriculum in forest soils we must recognize current differences among forest schools. Some forest schools are associated with state agricultural colleges and can draw upon the resources of these departments. Other schools are entirely separate from agricultural schools and must build up their own curricula. For such schools it may be physically impossible to establish the complete training program as proposed by Wilde, but this would not eliminate these schools as important cogs in the forest soils training program. Any proposed curricula must rest upon the basis or purpose for which the training is given.

In the undergraduate curriculum we are essentially training foresters, and the knowledge of soils is one important phase of the training that they must secure. By necessity the soils information acquired by the undergraduate must come from one required course in soils, perhaps supplemented by one elective course. This required course should cover basic soils, and soils as applied to forestry with special attempts to interest the student in the many implications and applications of soils in forest management. At best the B.S. forestry graduate can have only a very meagre knowledge of soils, but it should serve to give him an appreciation and understanding of the place of soils in forest growth and management. Particular emphasis should be placed on a soils classification of forest lands. A course in geology should also be required as part of the curriculum.

Professor Wilde sees a much broader training in soils for an M.S. forester than it is possible to acquire in two years. I feel that the M.S. degree should be primarily a training in forestry as a forest manager, following a B.S. in forest management. It should include enough forest soils training for the individual to appreciate the significance of soils in forest growth and management, but not enough to make him a technically trained soils man. At the present time few people would be willing to employ a technically trained soils man as a forest manager, but many would employ a forest management man with a background in soils. These are the men who will lead in the work of getting forest soils information into its rightful place in the forest management program. They are also the men who can promote additional forest soils training. An M.S. forester cannot hope to acquire training to enable him to serve as a soil surveyor, drainage technician, plant propagator, or soil analyst, nor is it desirable that he should. His most useful function will be as a forest manager with a soils background.

With this in mind it would be profitable to eliminate a number of the courses proposed by Wilde and substitute advanced forestry courses. A useful additional course to further show the application of soils would be in soil mechanics or engineering properties of soils.

The Ph.D. training in forest soils should specifically equip the individual to cover the more technical phases of soil science and to delve into the fields of soil chemistry, physics, morphology, or biology and forest soil fertility, depending upon the desires of the man. This trained individual is the one who will be able to develop action programs and do research in forest soils in conjunction with the needs of the forest manager. He can also handle the problems arising in the operation of forest nurseries. This degree should be reserved for a few individuals who have a keen interest in forest soils.

Dr. Wilde's suggested Ph.D. training, including some of the courses proposed for the M.S. is basically sound and covers most of the necessary subjects. However, I feel that he has neglected geology and mineralogy in all of his proposed curricula, as well as meteorology. A knowledge of surface geology is very important in soils work, particularly in classification. Very pertinent additions to the program would be training in the techniques of radioactive chemistry as well as a course in colloidal chemistry

Comments

T. S. Coile

Professor of Forest Soils, Duke University, Durham, N. C.

I HAVE FOUND Dr. Wilde's article to be interesting and thought provoking. I enjoyed his general thesis and do not wish to select any points for specific agreement or disagreement. However, there are a few comments I would like to add to his. They are:

1. Teaching and research in the various areas of both forestry and soil science have become so restricted in scope, and the horizons of individual instructors so limited, that the college student finds himself taking what appears to him to be a collection of unrelated, nicely delineated courses in dendrology, general properties of soils, silvics, soil physics, silviculture 1, -2, and -3, soil genesis and classification, forest management and so on. There are indeed very few teachers or research workers in either silviculture or forest management today who understand sufficiently certain fundamental aspects of forest soils to be able to judge the usefulness of, and are able to apply, the results of past and contemporary research in soils.

I believe that too many foresters, as students and later as practitioners in the field, have been overly indoctrinated with pride for a "profession" which tends to be concerned with trees alone; and, if at all possible, the above-ground parts of trees only. This overemphasis in becoming, or of being, a "forester" results in a pronounced reticence to really study soils to the extent necessary for the understanding of the interrelations between forests and soils to the end that such understanding may find daily use in the practice of for-

estry. Concerning anything that is not a tree, foresters tend to want their instruction in a few very easy but very complete lessons. If such is not possible, it is often felt either that something is wrong with the subject or the instructor or both.

The study of forest soils must begin and end with the examination of soils in the field, and with the interpretation of soil features as they are related to forest growth and alternative methods of land management. Although definitive studies of physical, chemical and biological properties of soils may require exhaustive laboratory analyses, which for their proper execution and correlation presumes an adequate background in mathematics, physics, chemistry, and biology, the results of such studies must ultimately be interpreted in field practice.

My experience in teaching forest soils to graduate forestry students indicates that those who have had one or several courses in soil science in an agricultural college uniformly lack an understanding of the meaning of soil profile characteristics in terms of tree growth or even plant growth generally. In soil sciences, as in forestry, courses of study seem to multiply in number and become restricted in content in direct relation to the size of the staff and the length of time its members have served in one place. Too many courses in these applied sciences have developed as a result of the instructor's interest in a certain specific area rather than because of need for formal instruction in the subject. The need for many so-called advanced or new courses would disappear, if teachers of both forestry and soil science were to take inventory of their courses annually or continuously for the purpose of defining or redefining the scope of the instruction, and, on the basis of the inventory, cull out antiquated or immaterial subject matter.

2. Course work, both in the undergraduate and graduate level, should emphasize liberal arts and science rather than professional forestry or even soil science. It is difficult to see how the primary courses in general forestry can be covered in much less than 45 semester hours. In the ordinary four year undergraduate curricula this would leave 75 semester hours or two and one-half years for liberal arts and science. Even if available in an agricultural college, it becomes apparent that an undergraduate student cannot expect to elect many hours of soils without seriously reducing the hours in liberal arts and the basic sciences. One course each in soil physics, and in soil genesis and classification would be appropriate; or, better yet, one course in forest soils.

Most students who enter on work towards the master's degree find that they need certain additional basic courses in the sciences. These plus work in soils, plant physiology, and statistics and research on a thesis subject usually fill up one to two years of graduate study.

Work towards the doctorate usually implies adequate training in liberal arts and science, specific advanced training in certain sciences such as chemistry, biology, and mathematics, the equivalent of undergraduate training in general forestry and sufficiently study in the more fundamental areas of soil science to apply that knowledge to the special case of forest soils.

3. Employment opportunities for men trained in forestry and soils combined are excellent. In general, the forest soils man will be most useful in private and government forestry work, and in teaching and research, if his activity is not restricted to soils alone but rather includes the broader field of forest or land management.

← **Hemlock.**

From the painting by Albert Cloutier, commissioned by the Canadian Pulp and Paper Association. One of a series of forest scenes by distinguished artists depicting the chief forest species presently harvested by that industry for pulpwood.

Statistics from Schools of Forestry for 1952: Degrees Granted and Enrollments

Gordon D. Marckworth
Dean, College of Forestry, University of Washington, Seattle.

This article is another in a series of comparable papers appearing annually in the Journal of Forestry since 1934, reporting the enrollment at the schools of forestry and the numbers of degrees conferred. Statistics of this type were first assembled when the Forest Education Inquiry made its study in 1929-1931, and were published in the Inquiry's report in 1932.[1] The annual articles in the Journal have brought to date the figures for each successive year.[2]

THE 1952 STATISTICS on the schools of forestry in the United States are on the same basis as those for 1951 except that Arkansas Agricultural and Mechanical College has been added to the non-accredited schools. As its total enrollment is only 67, it has little effect on the overall statistics.

It has been customary to carry the statistics on the number of degrees granted on a calendar year basis and since the figures are requested in October, the schools operating on the quarter basis have to estimate the number who will graduate at the end of the autumn quarter. These estimates have been corrected after the end of the year, and for this reason, the number of degrees listed for 1951 will differ slightly from those listed last year.

Degrees Granted

During the calendar year 1952 the 34 schools of forestry awarded an estimated 1160 undergraduate degrees, 199 master's degrees and 19 doctor's degrees. Of the 1160 undergraduate degrees, 1003 or 86 percent were awarded by accredited schools compared to 1386 or 89 percent in 1951. All told, the number of undergraduate degrees awarded was 404 less than in 1951. As the enrollment in each of the three upper classes is less than the number of degrees granted in 1952, we can expect a continued decline for several years.

The number of graduate degrees awarded also showed a decline with the number of master's degrees dropping from 267 to 199, and the

TABLE 1.—SIGNIFICANT STATISTICS FOR 1951 AND 1952

	1951	1952
Bachelor's degrees conferred	1,564	1,160
Master's degrees conferred	267	199
Doctor's degrees conferred	21	19
Undergraduates enrolled	4,799	4,691
Members of freshman class	1,370	1,536
Members of the sophomore class	1,107	1,012
Members of the junior class	1,053	1,013
Members of the senior class	1,269	1,130
Graduate students—master's	344	281
Graduate students—doctor's	137	130

TABLE 2.—NUMBER OF DEGREES GRANTED FOR COMPLETION OF STUDIES AT SCHOOLS OF FORESTRY IN THE UNITED STATES FOR THE CALENDAR YEARS 1951 AND 1952

	Bachelor		Master		Doctor	
Accredited Schools	1951	1952	1951	1952	1951	1952
1. Alabama	28	12	—	—	—	—
2. California	59	66	7	4	1	—
3. Colorado	56	45	7	7	—	—
4. Duke	—	—	45	26	4	—
5. Florida	37	29	8	4	—	—
6. Georgia	58	37	4	3	—	—
7. Idaho	50	32	10	6	—	—
8. Iowa	73	44	2	—	—	—
9. Louisiana	38	26	5	8	—	—
10. Maine	54	30	1	3	—	—
11. Massachusetts	8	8	—	—	—	—
12. Michigan State	49	33	14	7	1	1
13. Michigan Univ.	106	45	43	24	6	5
14. Minnesota	66	54	11	6	2	1
15. Missouri	23	24	—	4	—	—
16. Montana	72	45	5	3	—	—
17. New York	157	135	40	33	2	5
18. North Carolina	40	34	5	5	—	—
19. Oregon	86	59	5	8	—	—
20. Pennsylvania	94	73	9	10	—	—
21. Purdue	59	60	—	5	—	1
22. Utah	57	42	12	9	—	—
23. Washington Univ.	73	38	4	4	—	4
24. West Virginia	43	32	—	—	—	—
25. Yale	—	—	30	20	5	2
Total	1,386	1,003	267	199	21	19
Not Accredited						
1. Arkansas	13	7				
2. Connecticut	12	14				
3. La. Poly.	25	13				
4. Mich. Mining	23	27				
5. New Hampshire	16	21				
6. Oklahoma	30	22				
7. Texas (S.F. Austin)	9	7				
8. Virginia Poly.	24	28				
9. Wash. State	26	18				
Total	178	157				
Grand Total	1,564	1,160	267	199	21	19

[1]Graves, H. S. and C. H. Guise. Forest education. Yale Univ. Press, New Haven. 1932.

[2]Guise, C. H. (Eighteen articles on degrees granted and enrollments at schools of forestry in the United States, 1934-1948.) Jour. Forestry 32:337-343; 33:402-405; 34:114-120; 35:77-83; 36:12-18; 37:197-202; 38:241-246; 39:359-364; 40:196-202; 41:87-91; 42:357-360; 43:172-175; 44:110-114; 45:174-180; 46:168-173; 47:93-100; 48:165-169; 49:7-12.
Marckworth, Gordon D. Jour. Forestry 50:262-265.

doctorates from 21 to 19. The master's degrees were awarded by 21 of the 25 accredited schools with 103 of the 199 degrees awarded by four schools, New York State College of Forestry (33), Duke University (26), University of Michigan (24), and Yale University (20). The doctorates were awarded by seven accredited schools with the University of Michigan (5), New York State College of Forestry (5), and the University of Washington (4) accounting for 14 of the 19 degrees awarded.

Summarizing past records, we find that 20,425 bachelor's degrees, 3,586 master's degrees and 252 doctor's degrees have been awarded since 1900 (Table 3).

TABLE 3.—NUMBER OF DEGREES GRANTED FOR COMPLETION OF STUDIES AT SCHOOLS OF FORESTRY IN THE UNITED STATES FOR THE CALENDAR YEARS 1900-1952

Years	Undergraduate degrees	Master's degrees	Doctor's degrees
1900	1		
1901	5		
1902	2	9	
1903	3	14	
1904	9	29	
1905	9	34	
1906	24	24	
1907	19	27	
1908	31	35	
1909	47	44	
1910	61	48	
1911	100	61	
1912	122	54	
1913	136	37	
1914	151	42	
1915	124	35	
1916	151	36	
1917	160	27	
1918	65	10	
1919	53	6	
1920	160	25	
1921	126	26	
1922	141	44	
1923	217	31	
1924	215	43	
1925	280	44	
1926	259	58	
1927	263	50	
1928	302	64	
1929	291	54	
1930	308	69	
1931	394	97	(34)[1]
1932	380	78	7
1933	355	65	6
1934	337	47	6
1935	423	58	8
1936	502	67	9
1937	803	75	7
1938	980	95	5
1939	1,102	112	8
1940	1,072	105	9
1941	834	117	12
1942	654	76	13
1943	446	28	6
1944	106	12	3
1945	51	18	7
1946	192	65	8
1947	553	223	7
1948	918	222	16
1949	1,443	205	12
1950	2,321	275	29
1951	1,564	267	21
1952	1,160	199	19
Total	20,425	3,586	252

[1]Total doctor's degrees granted prior to 1932. Break down by years not available.

TABLE 4.—ENROLLMENTS BY CLASSES AT SCHOOLS OF FORESTRY IN THE UNITED STATES FOR THE FALL TERM 1952-53

Accredited schools	Freshmen	Sophomore	Junior	Senior	Total undergraduates	Graduates: Masters	Graduates: Doctors
1. Alabama	35	11	21	11	78	1	
2. California	15	29	29	48	121	9	11
3. Colorado	124	74	64	57	319	13	
4. Duke						16	9
5. Florida	30	25	16	25	96	3	
6. Georgia	39	22	30	38	129	3	
7. Idaho	45	27	29	53	154	12	
8. Iowa	67	43	43	33	186	4	3
9. Louisiana	33	23	28	17	101	2	
10. Maine	78	49	51	39	217	2	
11. Massachusetts	22	17	15	7	61		
12. Michigan State	40	21	35	27	123	7	11
13. Michigan Univ.	25	18	42	68	153	39	28
14. Minnesota	58	40	44	40	182	10	6
15. Missouri	36	30	21	11	98	3	
16. Montana	49	34	46	46	175	11	
17. New York	161	143	130	114	548	47	38
18. North Carolina	54	34	18	47	153	11	
19. Oregon	104	63	46	63	276	6	
20. Pennsylvania	112	63	50	74	299	5	
21. Purdue	49	30	31	29	139	8	2
22. Utah	51	16	39	39	145	25	2
23. Wash. Univ.	63	36	41	58	198	14	7
24. West Virginia	47	26	23	26	122		
25. Yale						25	13
Total	1,337	874	892	970	4,073	276	130
Not accredited							
1. Arkansas	19	12	18	18	67		
2. Connecticut	16	15	7	12	50	5	
3. La. Poly.	23	10	7	11	51		
4. Mich. Mining	40	23	19	31	113		
5. New Hampshire	?	8	12	13	33		
6. Oklahoma	47	31	25	29	132		
7. Texas (S.F. Austin)	8	8	8	10	34		
8. Virginia Poly.	28	17	13	18	74		
9. Wash. State	20	14	12	18	64		
Total	199	138	121	160	618	5	
Grand total	1,536	1,012	1,013	1,130	4,691	281	130

Enrollment

Tables 4 to 10 deal with enrollments at the schools of forestry, both individually and collectively. In all cases only students who are regularly enrolled as candidates for a degree have been included.

The undergraduate enrollment has continued to decline from the peak registration of 8,212 students in 1948-49 to a new post-war low of 4,691. In view of the current increase in the freshman class and

TABLE 5.—UNDERGRADUATE ENROLLMENTS AT SCHOOLS OF FORESTRY IN THE UNITED STATES, 1903-1904 TO 1952-1953

Year	Enrollments	Year	Enrollments
1903-1904	19	1927-1928	1,957
1904-1905	39	1928-1929	2,079
1905-1906	51	1929-1930	2,123
1906-1907	98	1930-1931	2,120
1907-1908	143	1931-1932	2,573
1908-1909	258	1932-1933	2,388
1909-1910	357	1933-1934	2,246
1910-1911	518	1934-1935	3,791
1911-1912	591	1935-1936	5,406
1912-1913	637	1936-1937	6,032
1913-1914	868	1937-1938	6,067
1914-1915	904	1938-1939	5,144
1915-1916	944	1939-1940	4,487
1916-1917	897	1940-1941	3,763
1917-1918	560	1941-1942	2,881
1918-1919	498	1942-1943	2,326
1919-1920	927	1943-1944	503
1920-1921	1,092	1944-1945	571
1921-1922	1,363	1945-1946	1,473
1922-1923	1,347	1946-1947	7,010
1923-1924	1,439	1947-1948	7,454
1924-1925	1,624	1948-1949	8,212
1925-1926	1,771	1949-1950	7,469
1926-1927	1,880	1950-1951	5,935
		1951-1952	4,799
		1952-1953	4,691

TABLE 6.—UNDERGRADUATE FALL-TERM ENROLLMENTS BY CLASSES IN SCHOOLS OF FORESTRY IN THE UNITED STATES FOR THE YEARS 1933-1934 TO 1952-1953

Academic years	—Freshmen— Enrollment	Change	—Sophomores— Enrollment	Change	—Juniors— Enrollment	Change	—Seniors— Enrollment	Change	—Totals— Enrollment	Change
1929-1933 averages	773		597		476		398		2,244	
1933-1934	783		628		467		368		2,246	
1934-1935	1,751	+ 968	930	+ 302	671	+ 204	439	+ 71	3,791	+1,545
1935-1936	2,301	+ 550	1,587	+ 657	943	+ 272	575	+ 136	5,406	+1,615
1936-1537	2,044	— 257	1,771	+ 184	1,402	+ 459	815	+ 240	6,032	+ 626
1937-1938	1,919	— 125	1,656	— 115	1,378	— 24	1,114	+ 299	6,067	+ 35
1938-1939	1,403	— 516	1,235	— 421	1,294	— 84	1,212	+ 98	5,144	— 923
1939-1940	1,259	— 144	1,095	— 140	922	— 302	1,141	— 71	4,487	— 657
1940-1941	1,000	— 259	975	— 120	857	— 135	931	— 210	3,763	— 724
1941-1942	771	— 229	672	— 303	709	— 148	729	— 202	2,881	— 882
1942-1943	845	+ 74	580	— 92	404	— 305	497	— 232	2,326	— 555
1943-1944	199	— 646	94	— 486	101	— 303	109	— 388	503	—1,823
1944-1945	321	+ 122	114	+ 20	64	— 37	72	— 37	571	+ 68
1945-1946	840	+ 519	315	+ 201	205	+ 141	113	+ 41	1,473	+ 902
1946-1947	3,611	+2,771	1,840	+1,525	914	+ 709	645	+ 532	7,010	+5,537
1947-1948	2,061	—1,550	2,878	+1,038	1,577	+ 663	938	+ 293	7,454	+ 444
1948-1949	1,851	— 210	2,178	— 700	2,497	+ 920	1,686	+ 748	8,212	+ 758
1949-1950	1,485	— 366	1,667	— 511	1,816	— 681	2,501	+ 815	7,469	— 743
1950-1951	1,442	— 43	1,379	— 288	1,384	— 432	1,730	— 771	5,935	—1,534
1951-1952	1,370	— 72	1,107	— 272	1,053	— 331	1,269	— 461	4,799	—1,136
1952-1953	1,536	+ 166	1,012	— 95	1,013	— 40	1,130	— 139	4,691	— 108

TABLE 7.—FALL TERM ENROLLMENT OF GRADUATE STUDENTS IN SCHOOLS OF FORESTRY IN THE UNITED STATES FOR THE YEARS 1931-1932 TO 1952-1953

	Masters	Doctor's	Total
1931-1932	173	26	199
1932-1933	174	32	206
1933-1934	80	37	117
1934-1935	104	18	122
1935-1936	114	25	139
1936-1937	151	28	179
1937-1938	150	34	184
1938-1939	253	40	293
1939-1940	213	34	247
1940-1941	212	39	251
1941-1942	137	45	182
1942-1943	30	24	54
1943-1944	30	7	37
1944-1945	20	10	30
1945-1946	108	16	124
1946-1947	376	49	425
1947-1948	339	80	419
1948-1949	330	93	423
1949-1950	450	98	548
1950-1951	483	118	601
1951-1952	343	137	480
1952-1953	281	130	411

TABLE 8.—ENROLLMENTS OF VETERANS AND NONVETERANS AT SCHOOLS OF FORESTRY IN THE UNITED STATES FOR FALL TERM 1952-53 (SPECIAL STUDENTS EXCLUDED)

Accredited schools	Undergraduates Veterans	Undergraduates Non-veterans	Graduates Veterans	Graduates Non-veterans	Total Men	Total Women
1. Alabama	10	68		1	79	
2. California	33	87	14	6	140	1
3. Colorado	76	242	3	10	331	1
4. Duke			10	15	25	
5. Florida	20	76	1	2	99	
6. Georgia	56	73	1	2	132	
7. Idaho	19	135	1	11	166	
8. Iowa	23	161	6	1	191	2
9. Louisiana	41	60		2	103	
10. Maine	31	185		2	218	1
11. Massachusetts	5	56			61	
12. Michigan State	32	91	9	9	141	
13. Michigan Univ.	37	115	66		218	2
14. Minnesota	39	142	10	6	197	1
15. Missouri	11	87	1	2	101	
16. Montana	57	116	9	2	184	2
17. New York	60	488	58	26	632	1
18. North Carolina	37	116	5	6	264	
19. Oregon	68	208	4	2	182	
20. Pennsylvania	42	257	3	2	304	
21 Purdue	21	118	9	1	149	
22. Utah	49	96	12	15	172	
23. Washington Univ.	49	149	3	18	219	
24. West Virginia	30	92			122	
25 Yale			11	27	38	
Total	846	3,218	236	168	4,468	11
Not accredited						
1. Arkansas	16	50			66	1
2. Connecticut	11	39	5		55	
3. La. Poly.	12	39			51	
4. Mich. Mining	23	90			113	
5. New Hampshire	2	31			33	
6. Oklahoma	30	102			132	
7. Texas (S.F. Austin)	5	29			132	
8. Virginia Poly.	13	61			74	
9. Wash. State	12	52			64	
Total	124	493	5		622	1
Grand Total	970	3,711	241	168	5,090	12

assuming the same general trend next year we can expect a total undergraduate enrollment of approximately 5,000 in the fall of 1953.

Enrollment by Classes

The enrollment in the senior class continues to decline although considerably less than last year. With 117 fewer enrolled in this year's junior class than in the senior class, we can expect a further decline next year. The sophomore class enrollment has also dropped off slightly, and as it and the junior class enrollment differ by only one, we can expect a decline in the junior enrollment again next year. The freshman class is

Table 9.—Veteran and Nonveteran Enrollment Classified by Undergraduate and Graduate Groups for Years 1948-1949 to 1952-1953

	1948-1949		1949-1950		1950-1951		1951-1952		1952-1953	
	Number	*Percent*	*Number*	*Percent*	*Number*	*Percent*	*Number*	*Percent*	*Number*	*Percent*
Undergraduate	8,212	100	7,469	100	5,935	100	4,799	100	4,691	100
Veterans	6,199	75	4,591	61	2,544	43	1,396	29	970	21
Nonveterans	2,013	25	2,878	39	3,391	57	3,403	71	3,721	79
Graduate students	423	100	548	100	601	100	481	100	411	100
Veterans	325	77	450	82	447	74	339	70	241	59
Nonveterans	98	23	98	18	154	26	142	30	170	41

the only class which has shown any increase, increasing from 1,370 to 1,536 or 12 percent.

While the undergraduate enrollment of women has increased 67 percent, it is still insignificant since it has only increased from 6 to 10. In the current year there are 5 freshmen, 2 sophomores, 3 juniors and no seniors.

Graduate Enrollment

Graduate enrollment is confined to 23 of the 25 accredited schools and one of the non-accredited schools. The enrollment for the master's degree has dropped from 344 to 281 and for the doctorate from 137 to 130. New York leads in the enrollment for the master's degree with 47 followed by the University of Michigan with 39 and Utah and Yale with 25 each. New York also leads in candidates for the doctorate with 38, followed by the University of Michigan with 28 and Yale with 13.

Enrollment of Veterans

The enrollment of veterans continues to decline. Of the 5,102 men and women enrolled in the schools of forestry throughout the nation, only 1,211 or 24 percent are veterans compared to 33 percent in 1951. Of the 4,691 undergraduate students, 970 or 21 percent are veterans. The percentage decreases from 38 percent in the senior year to 10 percent in the freshman year (Table 10). Percentage-wise the veterans still dominate the graduate enrollment with 51 percent of the master's candidates and 76 percent of those enrolled for the doctorate. Considering all graduate students, the veterans account for 59 percent of the total compared to 70 percent last year and a high of 82 percent in 1949.

Table 10.—Veterans and Nonveterans in Undergraduate and Graduate Classes 1952-1953

	Veterans		Nonveterans			Total
			Men	Women		
	Number	Percent	Number	Number	Percent	
Freshmen	157	10	1,374	5	90	1,536
Sophomores	136	13	874	2	87	1,012
Juniors	250	25	760	3	75	1,013
Seniors	427	38	703		62	1,130
Total	970	21	3,711	10	79	4,691
Masters	142	51	138	1	49	281
Doctors	99	76	30	1	24	130
Total	241	59	168	2	41	411
Grand Total	1,211	24	3,879	12	76	5,102

Summary

The decline in enrollment which began in the 1949-50 scholastic year has continued. For the first time since 1946 the freshman class has shown an increase over the previous year. All other classes have shown a decline with the senior class showing the greatest. The present freshman class enrollment will boost the enrollment in the sophomore class next year; in fact it is expected that the freshman and sophomore classes will both show an increase next year. On the other hand, the junior and senior classes will continue to decline. The veteran enrollment continues to decline and now comprises only 21 percent of the undergraduate enrollment and 24 percent of the overall enrollment. The overall decline in enrollment is reflected in a decrease in the number of degrees awarded.

Administrative Management at the Grass Roots

James A. Egan

Staff Assistant in Timber Management
Regional Office, U.S.F.S., Albuquerque, N. M.

MANY ARTICLES AND BOOKS have been written about top management, by administrators and others. Few, however, have been written about the managerial responsibilities of administrators at the lower levels of the administrative hierarchy. The Forest Service ranger district provides an ideal subject for study as an administrative entity because here at the grass roots level we find a well rounded administrative unit. Its management entails all of the elements of administration which are ordinarily thought of in connection with the top management level. Authority is determined by the area of responsibility but, basically, the administrative problems are the same as in larger organizations.

The Forest Service is a decentralized agency. It promotes efficiency and effective relations with the public by its policy of having plans and decisions made at the lowest possible level. This decentralization is made practicable by the issuance of clearcut policies and instructions for guidance in handling functional and administrative work in the field, and by carefully defining the limitations of authority and responsibility at each level.

A comprehensive system of inspection and other controls keeps top management informed as to the quantity and quality of accomplishment, and enables it to steer the widely dispersed organization along lines consistent with major policies, plans and programs.

Luther Gulick (*1*) in the book, "Papers on the Science of Administration" describes the work of the chief executive by means of a made-up word, an acrostic—"POD-SCORB." PODSCORB stands for the initials of the functional elements which he feels comprise the administrative job. These elements are Planning, Organizing, Directing, Staffing, Co-ordinating, Reporting, and Budgeting. The job of the district ranger will be examined in the light of these elements.

Before going on to the analysis, it might be helpful to the reader to describe one representative ranger district. This district embraces a little more than 400,000 acres of federally owned land. The resources are varied. There is roughly two billion board feet of standing pine sawtimber. Four thousand cattle graze on its forage. Elk, deer, wild turkey, bear and javalena as well as small game—pigeons, rabbits and squirrels—share the wild lands with the domestic stock. Its waters supply a city of 5,000 people and a transcontinental railroad, as well as contributing to the agricultural water supply of a large farming area.

Planning

"Planning . . . is working out in broad outline the things that need to be done and the methods of doing them to accomplish the purpose set for the enterprise" (*1*).

Within the framework of laws, rules and regulations and the limitations prescribed by the funds available to him the ranger must plan to get the work of his district done. The regional forester and forest supervisor, within limits set by appropriations, determine what personnel may be hired and what funds spent to do the district's work. The Civil Service Commission, through job specifications, determines the rate of pay for each member of the organization. And the Congress, the Bureau of the Budget, and the Comptroller General as well as the Forest Service determine how the funds may be spent.

Standards of job performance have been set and time standards have been developed, based on the best available data. The ranger must determine for himself (with the advice and assistance of his superiors) how and to what extent the standards are to be met with the resources of manpower, equipment and materials that are at hand.

General Plans.—Resource management plans for each of the forest's resources are made either by the forest supervisor and his staff with participation by the ranger, or by the ranger with advice and assistance from the forest supervisor and, at times, the regional office staff. Plans are made for timber management, range management, recreation use and development, watershed management and to a limited extent wildlife management (since the game on most national forests is managed by state game departments and the Forest Service acts only in a cooperative and advisory capacity).

Each resource management plan, in brief, consists of an inventory of the resource, history of use, and plans for its protection and maximum use without jeopardizing other resources.

Annual Plans.—Based on the manpower, equipment and materials available, the ranger prepares his annual plans. The "Fire Plan," for example, lists the location of the members of the fire organization, the location and size of organized crews and trained individuals, the location of each piece of heavy equipment that can be called upon, the location and composition of each fire tool cache, and sources of food supplies. It also describes the measures to be taken to prevent, insofar as possible, man-caused fires.

The sale of timber is tied in with "working circle harvesting plans" but for each sawmill the ranger must determine from which areas timber will be sold and in what order. The appraisals of these tracts entails a lot of planning also. The location and type of roads, the extent and type of slash disposal, the type, location, and extent of

timber stand improvement work, and erosion control requirements all affect the appraisal value of the timber and so must be planned in advance.

In range management the ranger plans the numbers of livestock to be grazed, seasons of use, and management practices. Knowing the limitations of finance, he plans the construction of needed watering places, fences, trails, etc., and the maintenance of existing improvements. He plans to count the livestock on the range or as they move onto the forest, or from one fenced area (allotment) to another.

Similar annual plans are made for watershed management, recreation, wildlife management, and housekeeping. The upkeep of administrative structures and improvements, recruiting seasonal labor, the administration of special uses permitted on the forests, and training the district's personnel to mould them into an effective operating unit also require planning. These plans are simple and direct. They consist of the what, how, when, where, and by whom type of down to earth planning.

Monthly Trip and Job Plans.—Each month the ranger prepares a "Trip and Job Plan" in which he lists the important jobs that need attention during the month, the dates when he plans to do each job, and the trips that are necessary to accomplish them. Since a ranger district may be sixty or seventy miles across much time could be lost in duplicate travel if careful plans were not made. They serve as a check list of essential work and help the Ranger to make sure that all the jobs that need attention in a certain locality are taken care of on one trip.

Day to Day Plans.—Unanticipated jobs come up which require revision of the best laid plans. A large fire occurs, a hunter or child becomes lost, an unexpected visitor —official or otherwise—arrives at the station, a special report is required, or a work crew runs into unforeseen difficulties. These and similar occurrences are frequent. The ranger must take such matters in stride and be able to adjust his plans and those of his subordinates to meet them as they arise.

The planning phase of the ranger's job is by no means a minor one, in fact it is the one of the most vital. The reason is simple. Every ranger has more work to do than can be accomplished with the funds and manpower at his command. He can easily expend all of his time and energies on the routine tasks which confront him each morning. If he does not plan effectively, important jobs are likely to be neglected while less important ones consume his time. His planning tools consist of overall policies, programs, regulations and instructions, management plans for each resource; job load analyses and annual plans of work that cover the jobs to be done during the year, and job plans which crystallize the work program into a reality.

Organizing

"Organizing . . . is the establishment of the formal structure of authority through which work subdivisions are arranged, defined and coordinated for the defined objective. . . ."(*1*).

Leonard D. White (*2*) says, "Good organization and smooth operation are inseparably connected. Even though competent personnel may make any organization work, there is no sense in requiring them to work with a poor one."

The problems of organization vary with the size and complexity of the ranger district. A small district may have but three or four lookouts and fire guards, plus a small improvement crew. With such a small group of workers it is satisfactory to provide them with a set of written instructions outlining for each independent worker and foreman his responsibilities and the area and limitations of his authority. However, on districts with heavier and more varied workloads and a larger force of men (for example, the district previously described has an assistant ranger, conservation aide, timber salesman, timber stand improvement technician, fire control aide, telephone operator-clerk, two lookout-firemen, two relief lookouts, four firemen at isolated locations, a six-man fire crew, four relief firemen and fifteen-man brush disposal and timber stand improvement crew) organization assumes a more important role. Here it is essential that each independent workman and crew foreman have not only a clearcut definite understanding of his own job but he must also understand the job of each of the other members of the district force and their relationship to his job.

Understanding by all concerned of the organization structure and its objectives goes a long way towards eliminating minor misunderstandings which may mar the harmony and disrupt the operation of the group.

The small scale use of a technique commonly practiced in large organizations—both private and governmental—can be effectively employed, as follows: a district organization chart is prepared and brief job instruction sheets are appended to it; each member of the regular force is required to study the chart and job instructions, and each member of the seasonal force is required to do likewise at the time he is hired. The advantage of such media for orientation has been established beyond question in large organizations and is widely accepted. They are, in my experience, equally effective in small organizations.

The principles governing organization at the grass roots level are the same as in any organization. There must be definite, clearly defined lines of authority; specific allocation of responsibility; and planned coordination of all functional units. Each individual must understand not only his own niche, but his relationship to each of his co-workers, his subordinates and his superiors.

Staffing

"Staffing . . . is the whole personnel function of bringing in and training the staff and maintaining

favorable conditions of work. . . ." (*1*).

Again, as in planning, the funds made available together with the nature and magnitude of the overhead organization determine how much money there is to hire the personnel required to do the job on the ground. And the efficiency of all higher levels in the hierarchy is important in determining what portion of the appropriated funds reach the level where the field work must be done. For, "Is it not in the field, after all, that the goods are delivered and the public served?" (*3*).

After the amount of money available for administering a ranger district is established and job load analyzed, the regular positions are established according to the classification standards prescribed by the Civil Service Commission. The regular positions are filled through the standard federal system of civil service examination, certification and appointment. The local administrator has little or nothing to do with the filling of the permanent professional positions in the regular organization. The forest supervisor may reject an eligible, but the ranger must accept, at least provisionally, any appointee who is sent to him. Temporary positions are filled, according to civil service classification standards, by temporary appointees. It is in the filling of these temporary positions that the ranger may exercise his initiative and judgment. It is his responsibility to recruit, appoint, assign, train, supervise and dismiss the members of his temporary field force.

The district ranger must be a skilled trainer and he must be able to impart a portion of his skill to his subordinates in the regular organization. The assistant ranger and timber salesman positions are primarily training positions. The ranger can expect to have new men in each of these positions at least every two years and frequently their tenure is less than one year. At least half of his temporary men will be new each year and many of them will be students from forestry schools with little or no field experience. Obviously, then, the ranger who gets a good job done on a district with a heavy work load must be an effective trainer.

Training of immediate assistants (assistant ranger, conservation aide, timber stand improvement technician, timber salesman, etc.) cannot ordinarily be delegated. On the other hand, the training of the temporary force frequently can and should be delegated, at least in part, to experienced members of the staff. Fire guard training is ordinarily speeded up and simplified by holding a training school at which group training methods are practiced. Follow-up training on the job by the Ranger and his staff ties the group training in with each man's particular asignment.

One of the obstacles that must be overcome in maintaining morale at a high level on many ranger districts is the lack of adequate housing and of such primary conveniences as running water, sinks, inside toilets and bathing facilities. Where these material inadequacies exist they may be compensated for by the satisfying nature of the work, the beauty of the surroundings, the knowledge of being of service, and the traditionally high esprit de corps of the Forest Service. But there can be no sidestepping the fact that these conditions have a tendency to lower morale. The ranger must recognize this and make constant efforts towards keeping morale at a high level. Frequent visits to isolated stations, keeping all members of the organization informed of local activities, encouraging employee ideas and suggestions and using them, arranging group picnics and parties and keeping the latch-string out at the ranger station will all help. But none of these can replace a spirit of genuine interest by the ranger, his family and his staff in the personal well-being of each member of the organization and his family, a spirit of helpfulness towards all in the face of both personal and official difficulties, and a genuine friendliness towards members of the group.

Directing

"Directing . . . is the continuous task of making decisions and embodying them in specific and general orders and instructions and serving as the leader of the enterprise. . . ." (*1*).

The responsibility for decision making is the same on all ranger districts, but the opportunities for redeeming that responsibility vary widely. On a district a long way from the forest supervisor's headquarters an experienced ranger will make most of the decisions. On a district near to headquarters, the ranger may well find most of his decision making taken over by the supervisor and his staff. This can happen even though the supervisor's intentions are the best, for it takes a sincere and continuous effort on the part of the supervisor and his staff to keep the district's permittees[1] from going over the ranger's head, especially when the supervisor's office is just as conveniently at hand as the ranger's office.

When a supervisor allows himself or his staff to usurp the authority of his rangers he inadvertently starts the breakdown of efficient management. Under such circumstances the morale of the ranger force is certain to be low and the ranger hesitates to assume the responsibility which is his. And, once a permittee has successfully circumvented the ranger by going first to the supervisor, that course is apt to become the normal one. Fortunately for all concerned, most supervisors recognize the inherent danger to their organizations in this respect and vigorously uphold the ranger's right and responsibility for making the decisions necessary to the administration of his district. The far-sighted supervisor, when he discovers that one of his rangers has made an error that must be rectified, contacts him, and attempts to get him to recognize and correct his mistake. If

[1]An individual who has a permit on the forest to graze livestock, construct and maintain a summer residence or for any of the many other uses of the forest for which permits are issued.

this method fails, he informs the ranger of his error and requires him to rectify it himself. These procedures do not undermine the confidence of the permittees in their ranger, and serve as training media whereby the supervisor may train his rangers in making sound decisions. In emergencies the supervisor, of necessity, corrects the error himself and informs the ranger of his action at the first opportunity. But, when no emergency exists, the supervisor leaves the responsibility with the ranger where it belongs and sees to it that he corrects his own mistake.

A related problem is that of a superior officer — supervisor, staffman or regional officer—giving orders to the ranger's subordinates. Such occurrences are infrequent, but when they do occur they almost invariably cause difficulties. Again, in case of real emergencies, such action is justified.

The ranger's responsibility for making decisions is broad, and within the framework of the laws, rulings, regulations, policies and standards with which he is furnished in the form of manuals and handbooks, his authority for decision making is equally broad. Sound decisions can seldom be made on resource management matters without a detailed knowledge of conditions on the ground, and the man with the most intimate knowledge of these conditions is the ranger. In matters relative to going fires decisions are necessarily final. They must be made without delay. The necessity of quick, decisive action to avert disaster brooks no hesitancy and the worst possible decision is one to await decision from higher authority. As in the military, needless property damage and loss of life can result from failure to take decisive action.

After decisions have been made they must be implemented by orders and instructions. In the Forest Service procedures for issuing written instructions to the fire organization are well established and effectively covered by standards. Each fireman and lookout is given written instructions outlining the general requirements of his job. Monthly, he is furnished with a job list (or plan) covering the nonroutine work he is to accomplish.

The methods used in assigning tasks are of the utmost importance in supervising employees. Frequently the worker and the job to be done are many miles away from headquarters and close supervision is impossible. If the employee receives his orders in a manner that causes resentment he will not get much done. If he is made to feel that he is part and parcel of the Forest Service, and his orders are given to him diplomatically, he is likely to accomplish more than he would even under close supervision. If he can be given a feeling of importance, and if he can see and feel the measure of his accomplishments, he will need little supervision. Such elementary techniques as asking rather than telling, and seeking employee suggestions and adopting them whenever practicable, pay substantial dividends. The successful ranger must be skilled in the art of supervision.

In the management of a far flung organization where physical inconveniences and even hardships are not uncommon the element of leadership is of outstanding importance. Fire gives us the most obvious and understandable example. Fighting a fire is never easy. It is hot, back-breaking work. Frequently the fireman must work hard and fast and continuously in a rough isolated area with cold unpalatable food. If, indeed, he can take time to eat, for every firefighter soon learns that sitting down for five minutes or leaning on the shovel handle only results in a longer harder job to do. So the firefighter puts his head down and keeps it down until he has controlled the spread of the fire or help arrives. Such situations can, and often do, result in real hardships and if the firefighter is not loyal, if he gets discouraged and walks off the job, a real disaster can result.

In nearly all Forest Service work the workman must get along with a minimum of supervision. It is his loyalty to the organization, his desire to do as his superior wants him to do and his pride in individual accomplishment that cause him to do a good day's work and keep on doing good work.

Marshall Dimock (*3*) states, "Increasingly in recent years, students of scientific management and practical executives alike have discovered that the successful administrator has influence with people rather than power over them. Influence with people is determined by two principal factors: first, the possession of real executive ability which will inspire confidence; and second, appreciation of the efforts and contributions of others. If the executive never gives credit for unusual achievement and tries to deceive others into thinking that he alone is responsible for it, he soon discourages extra dedication to duty."

The ranger must be able to inspire loyalty to himself and his organization and he must nurture pride in a day's work well done. To do this he must first feel the same loyalty and pride himself. He must be an example for his men. He must be loyal to them and see to it that they know it. He must do all in his power to alleviate the hardships inherent in the job. He must recognize the psychological requirements of his men for appreciation, for measurable accomplishment, for the knowledge that they are important cogs in the machinery of operation and for the feeling of belonging to a group working together towards common goals. It is never easy to be a leader, but the successful ranger must be one.

Coordinating

"Coordinating . . . is the important duty of interrelating the various parts of the work. . . ." (*1*).

"When . . . delegation has taken place, the job of the executive is then to see that all parts of his organization are coordinated. His ability to coordinate is one of the principal tests of his professional equipment" (*3*).

Coordinating the different activities within a ranger district is not too complicated a task. Coordinating like activities between districts and with districts on adjoining forests is somewhat more complicated.

The type of activities that require coordination between districts are: the off-season manning of lookout towers to give the maximum coverage of high hazard areas, the management of livestock which graze on both districts, the supervision and counting of livestock on driveways that pass through both districts, and the supervision of logging operations that cut on both districts concurrently or progress from one district to the neighboring one. These problems of coordination can usually be solved without much ado since their resolution is mutually beneficial.

Coordinating the different activities on a district requires that a ranger's supervisor check on his activities. He must know his rangers well enough to recognize the tendency of a particular man to slight an activity which he does not enjoy and concentrate on one that he does enjoy, some rangers like timber management work and dislike range management work and vice versa. Rangers, as a rule, are not very good office men, but because they seldom have stenographic help available they must spend a considerable proportion of their time in doing routine office work. Rangers without clerical help are prone to neglect their office obligations even though they recognize their importance. The media for ascertaining whether a ranger is favoring or slighting any activity are available (dairy analyses, reports, inspections, etc.), and with these aids the supervisor keeps his rangers from indulging in lopsided administration.

The problem of directing the organizational effort after the work load has been analyzed, work plans developed, personnel assigned and work priorities established is reduced to a matter of month to month and day to day direction and supervision of the work force for the accomplishment of a well balanced work program. Such expedients as assigning a fence maintenance crew to work in an area of high fire hazard at a time of particular fire danger, assigning a fireman who is an accomplished carpenter or painter to a guard station where considerable maintenance is needed, or assigning a fireman who is a good "shade-tree" mechanic at headquarters where the equipment is concentrated and tools are available are simply good management and such matters should be kept constantly in mind so that the maximum amount of good quality work is accomplished with the work force.

The matter of "managing" ones supervisor is important. Effectively "managing" ones supervisor depends first on knowing him well—his plans, ambitions, hobbies, pet "peeves," and especially his principal interests. With this knowledge the ranger will know what type of matters to attend to first, how to approach his boss with his needs, what unusual items will be looked for in his inspections and what sort of management he wants to find. Exercising the "Finished Staff Work" principle is helpful in getting a ranger's program accepted by the supervisor. A program in final form for acceptance or rejection is much more liable to receive favorable consideration than is a nebulous idea or undeveloped brain-child. A program in which needs, advantages, disadvantages and costs are clearly presented does not waste the supervisor's time nor require him to exercise his imagination in order to visualize the full implications of the proposal.

Reporting

"Reporting . . . is keeping those to whom the executive is responsible informed as to what is going on, which thus includes keeping himself and his subordinates informed through records, research and inspection. . ." (*1*).

Reporting as defined by Gulick, can be divided into four categories. One keeping the forest supervisor informed as to what is going on; two, keeping himself (the ranger) informed; three, keeping the ranger's subordinates informed and four, keeping the public informed.

Keeping the Supervisor Informed. — The forest supervisor keeps himself informed of what is going on on the ranger district by his personal observations; through diary analyses, through reports from and discussions with the members of his staff, through reports from and discussions with the ranger; and by accompanying regional and Washington office specialists on functional inspections and reading their inspection reports. Each supervisor uses these media, but they differ in the emphasis and reliance placed on each.

Occasionally a supervisor relies almost entirely upon his personal observations for information. Some have trained themselves in the art of observation over the years so that they miss very little in their travels about the forest. But to do this they must get up early and work late. It is also true that unless the supervisor is unusually astute he will see pretty much what the ranger wants him to see. That ranger, on a large district, is fortunate and conscientious who sees every part of his district once in two or three years. So it is impossible for the supervisor, with five or even ten districts, to look after, and a host of additional administrative responsibilities, to see everything that needs attention. He must rely on his staff for the details. Donald C. Stone states it this way, "Whatever may be the notions of what executives do and how they do it, the bedrock fact is that the executive must rely on his staff for the achievement of his objectives." (*1*).

The eyes and ears of the manager of such a widely dispersed organization as a national forest are his staff. The supervisor multiplies himself through proper employment of his staff and avails himself of their functional expertness. Through his staff the supervisor can inspect the composite minutiae whose interrelations forecast ecological change, deterioration

of soils, extirpation or eruptive multiplication of wildlife species, and tree disease or insect epidemic. The staff inspects the functional activities of the ranger and trains him when he needs it. And the inspection reports furnish the supervisor with the detailed information about the condition and trend of management of each function. Individual and staff conferences bring out additional facts not fully covered in reports.

The ranger keeps the forest supervisor informed of his activities and of his needs for men, materials and equipment. He also sees to it that the supervisor and staff are aware of the work projects that need doing and the funds needed to get them done. Almost any district in the West could use to advantage every cent the entire forest gets each year for construction and maintenance. If the ranger fails to keep the supervisor informed as to the needs of his district, he will surely not get his proportional share of the funds that are available. And if he is astute in presenting his case, he may get a little more than his share.

The ranger keeps the supervisor informed by personal conferences, telephone calls, ranger-staff conferences, by sending him copies of reports on inspections, by reporting currently the completion of work projects, by reports of timber cut and sold, by "10-day" fire reports in fire season, by annual reports on recreational visitors, wildlife populations and harvest, and grazing use, by annual plans of work, and by annual progress reports.

Keeping Himself Informed. — The ranger keeps himself informed by personally inspecting the activities under his supervision; by consulting with the supervisor and his staff specialists; by consulting the handbooks and manuals furnished for his guidance; by consulting with specialists from regional and Washington headquarters and from experiment stations; by reading professional and trade journals and experiment station reports; by buying new professional books as they are published and studying them. He also profits through his day to day contacts with his subordinates, with forest users and with the public. To serve the public well, he must also keep himself informed with regard to current events and public affairs.

Donald Stone, writing of the executive, puts it this way: "as a basic minimum, he should find time to keep up-to-date on the journals and books that give perspective to government enterprise, and I do not mean here administrative literature, important as that may be. If he lets himself become so preoccupied with his immediate problems that he fails to keep up with life that is going on about him, he lets slip one of the best ways through which he can have an impact on his organizaiton—by helping to bridge the gap between it and the world at large." (*4*).

Keeping His Subordinates Informed. — The ranger keeps his subordinates informed by reviewing inspection reports with them, routing official mail and publications to them for review, conducting training schools and conferences and through individual personal contacts. Keeping his subordinates fully informed as to what is going on is one of the most important factors in maintaining morale and molding an effective organizational team. And it is one of the easiest to overlook in the midst of a busy field season.

One method of keeping firemen and lookouts in isolated locations informed is to assign the fire dispatcher the responsibility of telling them what is going on during his daily routine talks with each of them. This method should be supplemented by visits of the ranger and his assistants whenever their work takes them to the vicinity of a fire station or isolated work camp.

Keeping the Public Informed.— It is an obligation of all governmental organizations to keep the public informed as to their programs and how the public can aid in making these programs effective. The ranger does his part by giving talks and showing movies to schools and other organized groups; by conducting "show-me" trips about his district; by preparing newspaper items for local newspapers; and through his daily contacts with individuals—both local and transient.

Budgeting

Budgeting is a function in which the ranger plays a minor role. Most of the financial planning, budget preparation, fund and cost accounting are carried on at the regional and forest levels. Yet these are activities with which the ranger can ill afford to be unfamiliar. He must see to it that his plans are presented to the supervisor in such a form that his needs for materials, equipment and personal services are clearly discernable, amply justified, and can readily be converted to dollars and cents for consideration in financial planning and the annual budget. He must be sufficiently familiar with the functional appropriations of congress, the statutory and administrative limitations on fund expenditures, the general principles of fund and cost accounting, the items on mandatory schedules (requiring purchase from the General Services Administration or from federal prisons), the limitations on open market purchases, federal labor laws and government travel regulations to enable him to maintain "fiscal integrity" in the expenditure of funds and the utilization of personal services on his district.

The ranger must also keep himself posted on the state of the finances on the forest—what funds are near exhaustion and what have substantial balances — so he can plan his work in accordance with the changing financial situation. (This is especially necessary near the end of the fiscal year!)

Summary and Conclusions

The job of the district ranger includes all of the functional elements comprising the work of any chief executive, but the degree of emphasis on each differs from that at higher administrative levels. Policy making, development of standards, inspection, and budget-

ing play relatively minor roles at the grass roots, while planning, organizing, staffing, directing, coordinating and reporting are of great importance. The scope of these elements for any executive is defined by the area of responsibility of each.

The ranger learns to apply the principles and techniques of sound management in an atmosphere free from the complexities and outside pressures that complicate top management. On the ranger district the results of good or poor administrative practices are quick in developing and their causes generally easy to discern. This makes the ranger job a good training position for administrators, (*5, 6*) and a good position in which to evaluate the individual with regard to personal aptitudes and characteristics which would contribute to his success or failure in more responsible administrative positions.

Literature Cited

1. GULICK, LUTHER and L. URWICK. 1937. Editors. Papers on the science of administration. New York Institute of Public Relations, Columbia Univ.
2. WHITE, LEONARD D. 1939. Introduction to the study of public administration. The Macmillian Co., New York.
3. DIMOCK, MARSHALL E. 1945. The executive in action. Harper and Brothers Pub. New York.
4. STONE, DONALD C. 1945. New horizons in public administration. Univ. of Alabama Press.
5. EAGAN, JAMES A. 1937. In service training in forestry. Unpublished master's thesis. New York State College of Forestry.
6. ———. 1942. An evaluation of the administrative training program of the United States Forest Service. Unpublished master's thesis. The American Univ., Washington, D. C.

My Observations of Israel's Conservation Program

J. J. Levison

Consulting landscape forester, Sea Cliff, N. Y.

FIG. 1.—Aleppo pine in natural forest of *Quercus ithaburensis*.

FIG. 2.—Mixer plantation of pine and cypressus in West Galilee (one year old).

NATURAL RESOURCE CONSERVATION and agriculture are basic needs in Israel. During my visit to Israel in 1952 I was amazed to see the vast amount of work being done in forestry and agriculture. It is well organized and capable of further expansion.

To appreciate Israel's conservation problems and how they are met, one should know the men doing the work. Dr. A. Y. Goor, the head of the Department of Forests, is a typical example of the men and spirit prevailing throughout the land. Born and raised in Israel, he obtained his academic education in the University of Southern California and received his doctor's degree in forestry from Yale University. Dr. Goor also has a Ph.D. in forestry from Oxford University and has studied in forestry schools in France and India.

Department of Forests

The Department of Forests has a staff of trained technical assistants, with professional degrees from Yale, the University of Jerusalem, Zurich, Edinburgh University, and other colleges. Each member of the staff is responsible for a special field: silviculture, wood technology, forest management, entomology, and other phases of forestry.

Fig. 3.—*Acacia cynophylla.* Sharon Dunes plantation (one year old).

Fig. 4.—Roadside plantation. *Eucalyptus rostrata* (three years old).

In addition to this permanent staff, the department has cooperation of specialists such as Dr. Walter C. Lowdermilk, the well-known forester and soil conservationist sent by the U. S. Government, and of professors of the Israeli universities, some of whom have international reputations in their specialized fields.

The department has a staff of about 120 employees to do routine work, and about 3,000 during the planting season. In 1951 they planted five million trees, requiring 16 tons of seed gathered from their own plantations. In 1952 they expected to plant ten million trees. The trees are grown in government nurseries. The main nursery is at Nathanya (named after Nathan Strauss). During the planting season, in addition to mass planting by the Department, thousands of free trees are distributed to the various settlements (called Kibbutzim), to towns, and to private individuals.

Condition of Land

To understand the reason for this extensive planting program, one needs only to examine the physical conditions of the land. The fertile valleys, suitable for agriculture, north of the Negev lie along the coastal plain, joining the plains of Judea east towards Jerusalem. The remaining lands bordering these valleys are mostly barren, rocky hills and some sandy wastelands and swamps. Many centuries ago, these hills were covered with dense forests and other vegetation. Israel was then a small area between empires at war. Its trees were cut down by invading conquerors, and for two thousand years the Arabs grazed their goats on this land, leaving little vegetation behind them. As one area became barren the Arabs moved on until the whole country surrounding the valleys became barren wasteland. With no vegetation to bind the soil, the rain waters did their inevitable damage, carrying soil to the rivers and the sea, flooding the farms and villages, and turning the once-fertile country into an absolute wasteland. This was Israel's heritage.

The first concern of the Department of Forests is to plant trees on the barren hills to stop erosion and to form windbreaks. The area now in need of this type of planting totals about a quarter of a million acres.

The salvation of the remaining farmland in Israel depends on the speed of covering the barren hills with vegetation. Thousands of acres of once-barren hills are now covered with millions of small thriving oaks and pines recently planted. On the hills near Tiberias are well-established young forests only six years old, and in other sections I saw forests established 15 years ago, now dense and thrifty, 20 to 25 feet high.

Sandy areas are also being planted to bind the sifting sand and prevent dust storms. The roots of acacias, tamarix, and pines are planted about two feet below the surface of the sand with a stem of about two feet protruding above the sand. The plantings I saw are thriving and doing the job admirably.

In the swamp areas extensive drainage is being done. Where there is too much water in the soil it is run off into small artificial lakes which are stocked with fish for home consumption.

Reclamation of swamps has been going on in Israel for some time. The plain of Israel near Nazareth, an area of about thirty miles long and ten miles wide, was one of the best examples I saw. Today it is beautiful farmland much cultivated with numerous settlements. Thirty years ago it was a muddy swamp noted for malaria and yellow fever.

Roadside, park, and street planting is extensive. So far, 400 miles of roads have been planted, mostly with quick-growing trees such as eucalyptus, cypress, and casuriana pine. Three or four rows of trees are set out on either side of the road and whole groves near factories. These plantings help to keep out dust from the settlements, form windbreaks for neighboring farms, and give shade to the roadways.

Eucalyptus has been much planted along the main highways because it grows fast. Gradually, it will be replaced with the more valuable and more lasting Cedar

of Lebanon and other hardier species. I saw 54 different species of eucalyptus being tried out at the Government Forest Experiment Station. One entomologist is studying its enemies and other technicians its best uses.

Street planting in the towns is left to the municipal authorities under the specific direction of someone trained in that field, subject to advice from government specialists. I was pleased to see that they have taken into consideration the fundamental principles of good street planting, such as the use of permanent hardy trees and the use of uniform species on the same street.

In Tel Aviv the tamarix is used as a street tree. In parts of the United States it is only a shrub, whereas over there it grows to tree size. Park planting, of which I saw some commendable examples has simplicity and charm. The public park and outdoor theater at Nathanya is a good example.

Planning

What impressed me most is the fact that all these efforts are coordinated under the supervision of a planning commission with subcomittees in charge of different fields of activity. The commission in cooperation with the conservation of forests, for example, decides which areas are to be reforested, which are to be left for settlements, for farming, or for factory sites. Every decision is recorded on maps and all activities are coordinated for the good of the country as a whole. When necessary, the commission establishes special ordinances to meet local problems as, for example, the 200-acre area in the vicinity of Tiberias where for centuries the district suffered from floods with considerable loss of life and property. Here the commission ordered contour terracing as one means of arresting floods. It also ordered tree planting, restrictions on grazing, and the most advantageous use of the land for special types of farming.

All this resulted in cooperative action against floods. Within five years after the ordinances were put into effect and the work started there was complete reclamation of the area, whereas for centuries the Arabs did nothing about it and even the Romans, who two thousand years ago built aqueducts in this area to stop the floods, failed where the Israelis succeeded.

The manual labor comes from three main sources—the labor unions, the farmers, and the Kibbutzim. The labor union is the main source; the farmers take care of their own work, and the various settlements (Kibbutzim) take care of theirs. The Kibbutzim are small settlements where every member devotes all his time cooperatively without pay for the good of the settlement, subject to the general rules of the country as a whole.

Started forty years ago, there are 300 of them with populations varying from 150 to 1,800. Most are complete, independent units, equipped with hospitals, schools, clubs, and child nurseries. These settlements are absorbing the many newcomers who, in most cases, are unfit for constructive work and, in the beginning, are liabilities rather than assets. In due time, however, the older members of the Kibbutzim teach the newcomers how to take care of themselves and how to become useful at some manual labor.

In agriculture also the Israelis are progressive. With many to feed in a land utterly depleted they realize the urgency of agricultural development. They have agricultural schools where up-to-date scientific farming is taught. They have agricultural experiment stations where new plant material and new methods are tested. Extension courses in practical farming are given throughout the land where everyone can conveniently come for practical instruction. At the Weizman Institute in Rehovot I saw an experimental area for testing different varieties of fruit trees. One of its specialists is doing research work on the use of the castor oil bean in the production of nylon, while another is doing research on cancer.

At the Ruppin School of Agriculture, conveniently located along the main highway near Tel Aviv, I saw groups of young men and women training to be farmers and was impressed with their plots of land systematically planted with trees, shrubs, and flowers for purposes of experiment and demonstration. At Zikhron, one of the vine growing centers, I was interested to see the different varieties of grapes which they use, and in the orange belt I saw the same enthusiastic initiative in their fruit-growing methods.

Summary

The approach of the people of Israel to conservation and agriculture is scientific and progressive. They have organized a basic framework capable of greater accomplishments. They have laid the foundations for many industries such as oil-refining, cement, potash, iron, glass, chemicals, plywood, textiles, tires, diamond cutting, wines, jams, juices of all sorts, tobacco, and fruit.

They still need financial aid to buy equipment. Above all, they need raw material to work with. Their neighboring countries should be the logical sources of supply. As soon as they acquire these raw materials and equipment, they will become a great help to the development and prosperity of the Arab and Egyptian states around them. I visited their neighboring countries and saw no evidence where they are doing it for themselves. I saw no reforestation or conservation work in these neighboring countries. Their agricultural methods are still most primitive and there is no incentive, no enthusiasm, no pride or initiative such as I saw in Israel.

Centuries ago the Israelis were the torchbearers of civilization and the founders of our principal religions. They gave the world the first code of ethics by which men have long been guided. It is, therefore, not too much to expect that they will again bring to their neighbors in the Middle East and elsewhere the benefits of modern improvements in agriculture, forest conservation, and industry.

Procedures for Analyzing Small Woodlands

L. O. Grapp
Cooperative Forest Management, Region Nine, U.S.F.S., Milwaukee, Wisc.

Management plans for small woodland require the same basis of technical information as do longer range and more elaborate plans for larger holdings. The time required to secure this information must, however, be in proportion to the size, present and future value of the woodland. The development of the procedures described in this article, in Region Nine of the U. S. Forest Service, has contributed greatly to the work of foresters concerned with small woodlands.

THE Cooperative Forest Management Program is a joint venture of the state forestry agencies and the Department of Agriculture through the U. S. Forest Service. It is in this program that the procedures to be discussed are used. The scope of the cooperative management work includes furnishing technical assistance in timber management to owners of private woodlands, and assistance to the processors of primary wood products.

Data to Be Collected

The analysis of a farm woods or small woodland in this region is made by studying the individual trees in 1/5 acre sample plots. The inventory divides all the trees on these plots into four classes, depending on the visual indications which each tree exhibits. These visual signs, or their absence, tell the story of how each tree has fared in its conflict with its neighbors in the fight for survival. These signs will tell a forester if the tree is adapted to the site, if it has enough room to grow, if it is capable of getting along with the other species present, if it has had hard luck with the elements, if it is ill or infested with insects, or whether it is growing thriftly, more or less holding its own, or going backward in sound volume. These signs, which are familiar to all foresters, divide the trees into the four classes of (1) the good growing stock, (2) the storage material, (3) the harvest material, and (4) the cull trees.

As indicated in the key to these classifications (Table 1), the first class is composed of trees which are definitely putting on a net growth. The amount of defect in these trees is usually minor. The second class is composed of trees which may be fast or slow growers, but which have evidence of decay to the extent that it is problematical whether a net growth will result. Individual trees in this class may be putting on a net growth, while other trees in the lower portion of this class may be actually static in net volume. As these trees are slated for early removal from the stand and the volume of their net growth is uncertain, any net growth from this class is not considered for purposes of regulating the cut. The third class is composed of trees which may be growing fast or slow, but which have evidence of serious decay which is definitely causing the tree to decline in net volume. The above three classes are classified with the thought in mind that the trees must remain in their class for the next ten years. The fourth class is composed of those trees which show visual defects to the extent that the forester estimates that less than 50 percent of their volume is merchantable.

The defect characteristic used in the key to these classifications have been correlated with cull studies made in hardwoods by the Lake States Forest Experiment Station.[1] The classification of the trees actually encompasses a study of cull. The average cull percent applied to the good growing stock is 5 percent; to the storage trees 10 percent, and to the harvest trees 25 percent of the gross volume. Thus this classification of the trees provides the forester with a definite estimation of the cull present in any woods analyzed.

The classification inventory provides the forester with data on the net volume of the trees in each class. If the productive capacity of the forest is to be maintained or improved, it is obvious that none of the trees classed as good growing stock can be harvested in the near future. Therefore the growth study which is a part of the analysis of the woodland is confined to and based on the good growing stock only. This applies equally to the merchantable-sized trees and to the ingrowth or near-merchantable trees. An increment boring is made on a good growing tree of the predominating species in each plot measured. The number of annual rings in the last radial inch is determined. The average number of rings per inch is then figured from the ring counts on all plots and for all species combined. From the tally sheet, the average d.b.h. and average used length for all trees tallied is computed. These data are then applied to a simple formula to compute the growth per average tree per year.

The growth of the average tree per year is multiplied by the number of good growing stock trees 12 inches d.b.h. and larger per acre The board feet of growth contributed per tree by the 10 inch d.b.h. ingrowth trees is determined by dividing the total volume brought into the stand per tree by the number of rings required to grow such trees to 12 inches, d.b.h. For this region, a volume of 40, 50, or 60 bd. ft. per 12 inch d.b.h. tree is used respectively for short, medium or tall timber. The total annual growth per acre is then obtained by adding the growth produced by the 12 inch d.b.h. and larger trees, to the ingrowth from the 10 inch d.b.h. trees. These growth figures are considered as net growth and are known to be

[1] Zillgett, W. M. and S. R. Gevorkiantz. Estimating cull in northern hardwoods. Lake States Forest Expt. Sta. Paper No. 3. November, 1946.

TABLE I.—CHARACTERISTICS FOR THE CLASSIFICATION OF TREES

1. Good Growing Stock—5 Percent Cull
   (a) Thrift Characteristics
      (1) Dominant or co-dominant crown position.
      (2) Limbs healthy or only one large (6″ or larger) and a few small (less than 6″) dead limbs present. The large dead limb allowed should not be in the top of the merchantable length.
      (3 Foliage dark green, dense, leaves normal.
      (4) Trunk usually perpendicular, although leaning of trunk allowable if roots have not been sprung.
      (5) Root free of defect—showing no evidence of having been badly sprung.
   (b) Defect Characteristics
      (1) Ingrown bark allowed.
      (2) Sound burls allowed.
      (3) Small broken or dead limbs 2″ or less in diameter allowed on trunk (not important on species with durable wood.)
      (4) Small tight seams less than 6′ long allowed.
      (5) Small crack, scar, or small sealed limb swell allowed.
      (6) Slight crook or sweep allowed if it will cut out.
      (7) Small surface injuries on butt allowed.

2. Storage on the Stump Material—10 Percent Cull
   (a) Thrift Characteristics
      (1) Crown may be dominant, co-dominant, or intermediate in the crown canopy.
      (2) Two large and several small dead limbs allowed in crown or near the top of usable length (not important on species with durable wood.)
      (3) Foliage healthy to slightly yellow leaves, smaller size than normal.
      (4) Trunk may be leaning if roots not sprung.
      (5) Roots may be slightly defective but should not be sprung to any appreciable extent.
      (6) Overly large trees on average sites should be placed in this class even though thrifty and sound.
   (b) Defect Characteristics
      (1) Sweep or crook allowed if loss is less than 15 percent of tree volume.
      (2) A large tight or healed seam allowed.
      (3) Large scars and large limb swells allowed if completely healed over.
      (4) Several broken or dead limbs allowed on lower trunk if not larger than 2″ in diameter. Larger dead limbs and small holes allowed on trunk if they occur near top of merchantable length (not important on species with durable wood.)
      (5) Small injuries of recent origin to roots or trunk allowed (1 to 5 yrs. old.)

3. Harvest Material—Cull Deduction 25 Percent
   (a) Thrift Characteristics
      (1) Crown may be dominant, co-dominant, intermediate or suppressed.
      (2) Two or more large dead or broken limbs in crown (6″ or larger). Spike tops.
      (3) Foliage unhealthy in appearance, leaves small, foliage sparse.
      (4) Trunk may have a heavy lean and roots may be sprung.
      (5) Roots seriously defective and may be sprung.
   (b) Defect Characteristics—(If defects cause over 50 percent deductions, tree becomes a cull.)
      (1) Sweep or crook causing loss of more than 15 percent of the tree volume.
      (2) Large open seams.
      (3) Large open scars, large open limb sockets.
      (4) One or more large broken or dead limbs on lower trunk.
      (5) Presence of fruiting bodies of fungi.
      (6) Large holes on trunk.
      (7) Butt or heart rot plainly evident or detectable by sounding.
      (8) Large old or recent mechanical injuries to trunk or roots.
      (9) Low fork of main trunk, weak crotch, and wolf trees.

conservative, as no growth has been allowed for storage trees, nor for increased height growth on the younger or smaller trees during the ring count period.

In stands where the ingrowth accounts for 50 percent or more of the total annual growth, the growth from the 12 inch d.b.h. and larger trees alone is used to compute the allowable cut.

The Method of Inventory

The service forester before visiting an owner who has requested assistance in the management of his woods will usually take a look at the aerial photograph of the area in question. This examination of the picture will tell him whether the timber is of merchantable size and whether the case has possibilities for management work. If he thinks a cruise will be required he makes a tracing of the wooded area, showing boundaries between any areas with discernibly different cover types. The areas thus delineated usually represent a change in timber condition. These changes in timber condition are caused either by differences in the size, density of the trees, or by a change in timber type. The segregation of the areas of like appearance on the photograph indicates the extent of the area within which timber conditions are uniform.

This tracing of the aerial photo is later checked in the woods to determine whether the timber condition classes actually exist as shown on the map. If not, it is necessary to correct the boundaries by on-the-ground mapping. It is not necessary to attempt to interpret the aerial photograph at the time the tracing is made because this can be done on the ground. As a general rule any differences in timber condition which can be observed on the aerial picture can be noted on the ground in the woods. The acreage in each area of uniform timber condition is determined by means of an acreage grid at the time the tracing is made. If changes are made in the field it is necessary to adjust the acreages according to the changed boundaries. There may be two or more separated areas in a woods which are of the same timber condition class.

The plots are allocated to the timber condition classes on a weighted acreage basis. If the acreage in the smallest timber condition class is 5 acres or less, it is cruised as a unit by itself. The next smallest timber condition class in the balance of the woodland is then used as an index for the number of acres to represent one plot.

After the number of plots has been allocated to the various timber condition classes, the plots are arbitrarily located on the tracing so as to sample each major portion of the timber condition class. These locations are then located on the ground by means of compass and pacing, starting from a known point in the woods. This method eliminates personal choice in the selection of the plot locations. The plot location may on rare occasions fall in some unusual feature of the

woods. It should then be moved to avoid this unusual condition. Such features might include small patches of oak wilt killed trees, a small windfall area, a small isolated rock outcropping, or similar conditions that are not noted generally over the area.

The inventory work on the plots is done as carefully and accurately as possible. A plot tape is used to delineate the plot boundaries. Each tree 12 inches d.b.h. and over is measured for diameter with a diameter tape, and tallied in two-inch diameter classes. The usable heights of the trees are estimated after several samples have been measured by the pocket cruiser's stick as a check on the visual estimates. The various characteristics which class the tree are noted. The trees of each class are tallied on a separate tally sheet, using symbols to represent the various species. The cull trees are recorded. In addition 10 inch trees which have a fair chance of remaining in the stand and becoming merchantable are tallied. An increment boring is made on a good growing tree and the number of rings per last radial inch is recorded by species. It takes from 15 to 25 minutes for a service forester to work a plot, depending on how many questions the owner asks and the interest he displays in the inventory work. The entire job can be done by one man, but the forester usually puts the owner to work at various jobs in order to build up his interest in the woods. The entire cruising job can usually be accomplished in 2 to 3 hours for the average small woodland.

A cumulative volume tally sheet is used for this work, similar to the copy shown in Figure 1. These tally sheets use a composite volume table prepared by the Lake States Forest Experiment Station[2] and have been found to give reliable volumes when used in stands of mixed species. When used in pure stands or stands of only a few species, correction factors have been computed for each species which can be applied to the total volumes. The Central States Forest Experiment Station has checked these volumes for use in central hardwoods and found them reasonably reliable.[3] This station has also prepared correction factors to use in stands of single, or but few, species. These tally sheets are produced in the International $\frac{1}{4}$" Kerf, the Scribner Decimal C, and the Doyle log scales, by the H. Niedecken Company of Milwaukee, Wisconsin. The service foresters use the In-

CUMULATIVE VOLUME
INTERNATIONAL LOG SCALE TALLY SHEET

Based on Composite Volume Tables by the Lake States Forest Experiment Station -- 1943

FORM 2102 . . . . H. NIEDECKEN COMPANY, MILWAUKEE, WIS., PRINTED IN U. S. A.

NAME _____ INTERNATIONAL

COUNTY _____ DATE _____

STATE _____ ESTIMATOR _____

SECTION _____ TWP. _____ RANGE _____ FORTY _____

DBH	NUMBER OF 16 FOOT LOGS															VARIABLE TOP TO 6" D.I.				TOTAL B.F PER A.
	½			1			1½			2			2½			3			3½	4
12	2	3	4	5	6	9	11	14	4	8	12	16	5	10	15	6	LEGEND & CULL ½		PLOTS TALLIED	
	6	8	9	17	20	23	26	28	20	24	28	32	20	25	30	15				
	10	12	14	31	34	37	40	43	36	40	44	48	35	40	45	17			CULL TREES	
	15	16	18	46	48	51	54	57	52	56	60	64	50	55	60	23				
	20	21	22	60	63	66	68	71	68	72	76	80	65	70	75	29				
14	2	6	6	4	8	12	16	20	6	11	16	22	7	14	21	8			AV. DBH	
	8	10	13	24	28	32	36	40	28	33	38	44	28	35	42	16				
	15	17	19	43	47	51	55	59	50	55	60	66	49	56	63	24	33	41	3	NEAR MERCHANTABLE TREES
	21	23	25	63	67	71	75	79	72	77	82	88	70	77	84	49	57	65	9	18
	27	29	32	83	87	91	95	99	94	99	104	110	91	98	105	73	82	90	27	36
	34	36	38	103	107	111	115	118	116	121	126	132	112	119	126	98	106	114	45	54
16	3	6	9	5	10	16	21	26	7	15	22	29	9	18	27	11	21	32	12	25	37	3½	4
	12	15	18	32	37	42	47	52	37	44	51	59	36	45	54	43	53	64	49	62	74	14	15
	21	24	27	58	63	68	74	79	66	74	81	88	62	72	81	75	85	96	86	99	111	28	31
	30	32	35	84	89	94	100	105	96	103	110	118	90	99	108	106	117	128	124	136	148	42	46
	38	41	44	110	116	121	126	131	125	132	140	147	117	126	135	138	149	160	161	173	185	56	62
18	4	7	11	7	14	20	27	34	9	19	28	38	12	24	35	14	28	42	16	32	48	18	20
	15	18	22	40	47	54	61	68	47	56	66	75	47	59	70	56	70	83	64	80	96	36	40
	26	30	33	74	81	88	94	101	85	94	103	113	82	94	106	97	111	125	112	128	144	54	60
	37	41	44	108	115	121	128	135	123	132	141	150	118	129	141	139	153	167	160	176	192	72	80
20	5	9	14	8	17	26	34	42	12	24	35	47	15	30	44	18	35	52	20	40	60	22	25
	18	23	28	51	60	68	76	85	59	71	83	94	59	74	88	70	88	105	80	100	121	45	50
	32	37	41	94	103	110	119	128	106	118	130	142	103	118	133	122	140	158	141	161	181	68	75
	46	51	56	136	144	153	162	171	153	165	177	189	148	162	177	175	192	210	201	221	241	90	100
22	6	11	17	10	21	31	42	53	14	29	44	58	18	36	54	22	43	64	25	49	74	28	31
	22	28	34	63	73	84	94	104	72	87	102	116	72	90	108	86	108	129	99	124	148	56	61
24	7	13	20	13	25	38	50	63	17	35	52	69	22	43	65	26	51	77	30	59	89	33	37
	27	33	40	76	88	101	113	126	86	104	121	138	86	108	129	102	128	154	119	148	178	66	74
26	8	16	24	15	30	45	60	75	20	41	61	82	25	51	76	30	60	91	35	70	105	39	44
	32	40	47	90	105	120	135	150	102	123	145	164	103	127	151	121	151	181	140	174	209	79	88
28	9	19	28	17	35	52	70	87	24	48	72	96	30	60	90	35	70	106	41	81	122	46	51
	37	47	56	104	121	139	157	174	120	143	167	191	119	149	179	141	176	212	162	203	244	92	102
30	11	22	33	20	41	61	82	102	28	55	83	110	34	69	103	41	81	122	47	93	140	53	59
32	13	26	38	24	47	71	94	118	32	64	96	129	40	79	119	47	94	140	54	108	162	61	68
34	15	29	44	27	53	80	107	134	36	73	110	146	45	90	135	53	106	159	61	122	183	69	77
36	16	33	50	30	60	90	120	150	41	82	123	164	51	101	152	60	120	179	69	136	206	78	87
38	19	37	56	34	67	101	135	168	46	91	137	183	56	113	170	67	134	200	77	154	231	87	97
40	21	42	62	37	74	112	149	186	50	101	151	201	62	125	187	74	148	221	85	170	255	96	108
42	23	46	69	41	82	123	163	204	55	110	165	220	68	136	204	80	161	242	93	187	280	106	118

VOLUME IN HUNDREDS OF BOARD FEET - INTERNATIONAL

(A) MULTIPLY the SUM of last figures used in each block by 100.0000.(1) For VOLUME PER ACRE divide this product by the NUMBER of 1/5 acre plots.---(2) For MARKING TALLY VOLUME divide the product (from A) by 5.

FIG. 1.—Sample cumulative volume tally sheet for recording cruise information.

[2]Gevorkiantz, S. R. and J. W. Macon. Estimating volume on the spot. Jour. Forestry 40: 652-655, 1942.

[3]Schnur, G. Luther and Richard D. Lane. Aids for computing tree volumes in Illinois. Technical Paper No. 115, August, 1950.

TRACT VOLUME SUMMARY

Name _____ No. _____ Date _____

Timber Type _____ Soil Type _____ Computor _____

Growing Stock Legend ☐ Good ☐ Storage ☐ Harvest

dbh	Total No. of Trees	SPECIES									
6											
8											
10											
12											
14											
16											
18											
20											
22											
24											
Total											

Above totals × 100 (for cordwood 0.1) ÷ No. 1/5 acre plots = Gross Volume per Acre.

Total No. Trees _____ ÷ Acreage in plots _____ = No. of Trees per acre (Total All Species) _____

Total × 100										
Gross Vol. per acre										
Near Merch. Volume										
Gross Total Vol. per A.										
Net Factor										
Net Volume per acre										
Tract Area										
Total Vol. on tract										

Average dbh _____ Number of 1/5 Acre Plots _____ Accuracy _____%

Average merchantable height _____ Number of poles per acre _____

Average growth rate, rings per inch _____ Number of saplings per acre _____

FIG. 2.—Sample Tract Volume Summary sheet for presenting cruise information.

ternational ¼" kerf scale for tallying the good growing stock and the scale in most common use locally for tallying the storage and harvest trees. These tally sheets are also used to record the marking tally in which case the tally sheet with the local scale rule is used.

The tally sheets are summarized on a prepared form, a copy of which is shown in Figure 2. All of the data collected can usually be computed within an hours' time. If necessary to do so, the volume only of the timber inventoried can be worked up in the woods in about 20 to 30 minutes. This quick and easy method of computing an inventory is a decided advantage to the busy service foresters.

Method of Using Form for Development of Economic Considerations

A work sheet form has been prepared and is printed on the reverse side of the cumulative volume tally sheets for the purpose of computing the values of the timber, the fuelwood available, the growth, the permissible annual or periodic cut, and the values in the growing forest. A copy of this form is shown in Figure 3.

This form (Fig. 3) represents a flexible scheme, rather than a prescribed method. It is a suggested method of carrying through calculations to show the approximate financial results from any type of cutting practice. Factors printed in on the sheet may be changed if better or more applicable figures are on hand. Primarily the sheet is designed to give the forester a simple systematic method of analyzing the economic results and value of the investment in residual timber resulting from any type of cutting practice. This analysis can be made in 20-30 minutes following completion of the woodlot inventory. With the results the forester is in a position to determine for himself on the ground the economic results of any type of cutting. With these results in mind, he can talk to the owner in economic terms most appropriate to sell that owner on the best type of practice for his situation.

Volume and Value Summary

The block at the top of the sheet is for summarizing the net volume from a cut and leave tally, for calculating total values based on current local prices and estimating fuelwood in tops and cull logs of trees in merchantable stand. This summary may be made for the average acre or for the total area.

Fuelwood in Cull Trees

Total number of cull trees is multiplied by the fuelwood volume for the average size cull tree to get total cords of cull fuelwood. The average diameter of cull trees may be judged in the field or may be computed if tally has been made by diameter classes. Application of the *net* return value per cord to the volume of fuelwood will give the total fuelwood value in cull trees.

Growth in Stand Left

1. The average tree in the stand left is determined by inspection or calculation, and its d.b.h., used height and rate of growth are listed in the blanks provided.

2. Taking factor F for the used height of the average tree, from the table of height factors, the formula listed under 2 is worked out. The diameter in inches times the used height in feet, times this factor, divided by 10 times the number of rings per inch growth rate, gives the approximate num-

ber of board feet net growth lumber tally of the average tree per year.[4]

The Use of the Data Collected

The service forester while working on the analysis of the woods with the owner, directly or indirectly obtains information from him concerning his plans, ideas, problems and requirements in connection with his woodland. This information is considered along with the data obtained from the analysis of the woods, to determine how the woodland can be managed under good forestry practices to best serve its owner. Quite often the woodland cannot be managed under what the forester believes to be the best practice because of needs, circumstances or plans of the owner. If the owner, in such cases, cannot be turned from his ideas, the forester then attempts to compromise the situation so that the best possible forestry practices can be used which will satisfy to a sufficient extent the owner's requirements.

The analysis of the woods informs the forester of the volume in healthy, good growing trees. It acquaints him with the volume in the trees which are moderately defective but which can be stored on the stump for at least a 10 year period without loss in net volume. It also tells him of the volume of the trees that are seriously defective and in ill health, which should be utilized as soon as the silvics of the woods and the circumstances of the owner will permit.

The forester knows he cannot maintain or improve the productive capacity of the woods if he recommends removal of any of the good growing stock. He therefore explores the possibilities for removal of the harvest and storage trees which will be best for both the woods and the owner.

The possibilities of an annual harvest, on a sustained yield basis or otherwise, depending on the capabilities of the woods, are discussed with the owner. If the discussion of the possibilities for an annual harvesting plan of management make it apparent that such a plan could not be executed under the circumstances of the owner, a commercial operation is recommended, based on a light cut and the shortest cutting cycle conditions will permit.

The growth data obtained by the analysis of the woods are used to compute the allowable annual cut

[4] A detailed explanation of the derivation of this formula and a comparable growth table are available.

I. VOLUME AND VALUE SUMMARY _____ ACRES

SPECIES →								ALL
VOLUME — MBM	TOTAL							
	GOOD GROWING							
	STORAGE							
	HARVEST							
PRICE PER MBM	GOOD GROWING	$	$	$	$	$	$	$ [B]
	STORAGE & HARVEST	$	$	$	$	$	$	$
VALUE	GOOD GROWING	$	$	$	$	$	$	$
	STORAGE	$	$	$	$	$	$	$
	HARVEST	$	$	$	$	$	$	$

II. FUELWOOD IN CULL TREES

APPROXIMATE FUEL VOLUME IN CULL TREES	
Average DBH	Standard Cords
12"	16
14" - 16"	3
18" - 20"	6
22" up	10

[E]

Total number of cull trees _____ X [E] _____ = _____ Total cords cull fuelwood

at $_____ per cord = $_____ Total value cull fuelwood

III. GROWTH ON GOOD GROWING STOCK

HEIGHT FACTORS	
H	F
16' - 1.20	
24' - 1.07	
32' - 1.00	
40' - .95	

1. Average tree (DBH 12" up) — DBH _____ inches [D], USED HEIGHT _____ feet [H] → GROWTH RATE IN RINGS PER INCH _____ [R]

2. GROWTH per year in average tree [D] _____ X [H] _____ X [F] _____ = _____ Board Feet [G]

$$\frac{}{10 \times [R]}$$

3. INGROWTH per year from NEAR MERCHANTABLE trees (DBH 10") into MERCHANTABLE stand (DBH 12" up)

Number of trees per acre 10" DBH _____ X $\frac{50}{[R]}$ board feet = _____ board feet [K]

4. TOTAL GROWTH per year:

Number of trees per acre (DBH 12" up) _____ X [G] _____ = _____ plus [K] _____ = _____ board feet PER ACRE [L]

5. Years required for growth to replace cut: (Cut) [M] / YEARS

[L] _____ X _____ acres = _____ board feet TOTAL in Farm Forest [M]

IV. PERMISSIBLE ANNUAL CUT

Permissible ANNUAL CUT: [L] _____ X .8 = _____ board feet PER ACRE [M] X _____ acres = _____ board feet TOTAL on Farm Forest

FUELWOOD in tops in annual cut: $\frac{[M] \_\_\_\_}{1000}$ X 1* = _____ cords PER ACRE X _____ acres = _____ cords TOTAL on Farm Forest

V. VALUES IN THE GROWING FARM FOREST

1. [L] _____ X Growth/acre per year — [B] stumpage @ $_____ per M; logs @ $_____ per M; products @ $_____ per M = [S] $_____; $_____; $_____ X _____ acres = $_____; $_____; $_____ TOTAL VALUE of yearly growth

2. INVESTMENT VALUE of gross income from Farm Forest Land = $\frac{[S]^{**}}{[P]}$

Timber sold as	VALUE OF FOREST LAND at Farmer investment money rate .0 ___ [P]	
	PER ACRE	TOTAL ___ acres
STUMPAGE	$	$
LOGS	$	$
PRODUCTS	$	$

* Approximately 1 standard cord per MBM fuelwood in tops and cull logs

** If investment value of net income is desired, deduct taxes and other charges from [S]

FIG. 3.—Form on reverse side of cumulative volume tally sheet for development of economic considerations.

and to determine if the woodland can be managed on a sustained yield basis. Woodlands which are considered to be understocked, and there are many of these, have their cutting regulated by a reduced allowable cut which is based on 80 percent of the annual growth. This enables a gradual build-up of the stocking. Woodlands containing young timber may be found to have very few of the storage or harvest trees. In this case the small volume needing removal is reserved for the needs of the owner and is recommended for cutting at the time such needs arise.

The growth rate is also used to determine the earning capacity of the woods for its owner. The total annual growth of the woods can be evaluated in terms of either stumpage, logs or as products such as lumber, posts, ties, pulpwood, etc. At whatever stage in the production of forest products the owner feels he must stop, the forester can take the current average prices for the forest products in this stage of production and apply these to the annual growth. This yearly value of the annual growth is then divided by the current rate of interest earned by long term investments. This will give the investment value of the woods for the owner. This value is based on the good growing stock only, so to it can be added the current value of the volume in the storage and harvest trees. These two values then represent the value of the woodland to the owner at the time the analysis is made. These values are based upon data which the owner has seen collected from his own woods and therefore are very realistic to him. The service foresters find these values very worth while in convincing an owner that he should properly manage his woods and not sell the good growing trees.

The classification of the trees in the analysis makes the preparation of marking rules very simple. If the forester's recommendations call for the removal of all the harvest trees, he has but to walk through the stand putting his mark on all trees which so classify. If the owner required a certain larger volume and the analysis showed the volume in harvest trees was insufficient, the forester would mark a portion of the storage trees, taking this portion from among those storage trees which were of the highest risk to leave. If only a portion of the harvest trees were to be marked he would take these from among the harvest trees of greatest risk to leave. If both harvest and storage trees are to be marked, the trees marked in each class are tallied on separate tally sheets and the cull deduction for their class applied to the gross volumes in the class to obtain net volume marked. The total volume already marked can be figured up in a few minutes on the cumulative tally sheet. This proves very handy in controlling the amount being marked so as to stay within the recommended cut.

If recommendations have been made for improving the composition of a stand and only a portion of the harvest trees are to be in the first cut, the marking will take all harvest trees of the undesirable species, plus enough of those of other species to make up the volume desired. When the cut gets into the storage trees, these trees of the undesirable species will be marked first. A glance over the number of storage trees in the various size classes will also indicate which sized trees in this class should be marked the heaviest to maintain a good distribution of sizes for each later cut. Whatever the recommendation for cutting may be, the data to guide the marking can be obtained from the analysis.

A great deal of talk in generalities can be very unconvincing to a woodland owner. Selling good forestry practices requires definite statements tied down to the actual conditions existing in an owner's woods. The Cooperative Forest Management foresters therefore attempt to prepare simple management plans for the owners which concisely state in easily understood language the essentials needed to guide the management work.

The Silviculture is Dictated by Nature

If careful thought is given to the tree classification characteristics it will be realized that there is a great deal of silviculture involved in the analysis. It is true that it is Nature's silviculture and not man's hasty effort to change the complexion of a woods in one brief cutting period. The forester by observing Nature's rules and signs can help her rehabilitate our present stands, reestablish true forest conditions in them, and develop the mixed hardwood type of forest best suited to the sites and conditions in each part of this region.

Ponderosa Pine Plantation Pruning

A. R. Liddicoet, E. F. Kimbrough, and E. J. Carpender
California Forest and Range Experiment Station, Berkeley.

AMONG the major sawtimber pines of North America, there is perhaps none which may be improved in quality by early pruning to the same extent as ponderosa pine (*Pinus ponderosa* Laws). In the large collection of pine species growing in the Eddy Arboretum[1] of the Institute of Forest Genetics this species is conspicuous, not only for its good growth, but for the size and persistence of its lower limbs. By comparison, the pines of the southeastern United States clear their stems rather early, and while the white pines retain their lower limbs for many years, these are smaller in diameter and shorter than those of ponderosa pine of the same age.

U. S. Forest Service

FIG. 1.—Section of plantation before pruning.

One of the plantation studies at the Institute of Forest Genetics consists of 10 acres of ponderosa pine grouped in square blocks of 16 trees each. Spacing between trees is 8 feet and between blocks of trees is 16 feet. Each block consists of the open-pollinated progeny of a single seed tree. The plantation consists of 3 replications, each of which contains the 16-tree progeny of 81 individual seed trees.

The trees were set out in 1939 as 2-0 seedlings. They were watered through 1941 and trees which died up to this time were replaced. The location of the plantation, at 2,700 feet on the west slope of the Sierra Nevada 4½ miles east of Placerville, Calif., on deep Aiken clay loam, as well as the early care of the trees, resulted in close to the maximum growth that can be expected of ponderosa pine.

U. S. Forest Service

FIG. 2.—Section of plantation after pruning.

In the autumn of 1951 pruning of this plantation was started, and a single replication, covering 3.3 acres and containing about 1,600 trees, was pruned to an average height of 8 feet. All trees were pruned, since the objects of the work were to reduce fire hazard and to facilitate measurements. Figures 1 and 2 show pruned and unpruned sections of the plantation.

Following pruning, d.b.h. and height of all trees were measured. Average height was 22.7 feet and d.b.h. was 5.5 inches. Some live branches on outside trees were as large as 2 inches in diameter and 12 feet in length. On interior trees branches had died up to a height of 6 feet, but most were still quite sound and little or no bark had yet sloughed off the dead branches.

Three types of pruning tools were used: a gasoline-powered limbing saw with an 18-inch bar and chipper teeth, weighing 25 pounds; a curved-bladed hand pruning saw; and a double-bitted

[1]Weidman, R. H. Trees in the Eddy Arboretum. California Forest and Range Exp. Sta. Forest Res. Note No. 53. 1947.

cruiser's axe, weighing 2½ pounds.

Pruning with the power saw required 3 minutes per tree. This operation was most effective if each tree had three or four branches on one side removed first by axe or hand saw. The cuts made by the power saw were not as clean as those made by the other methods, and after pruning a block of 16 trees the power-saw operator "relaxed" by polishing up some of the rougher cuts with an axe. The power saw requires a stout operator for this type of work, and the ceiling is 8 feet. The power saw was relatively most effective for trees with limbs larger than 1½ inches in diameter.

Pruning with the cruiser's axe required 5 minutes per tree. This tool, kept sharp, leaves the smoothest cut of the three tools, but requires an experienced axeman to avoid occasional damage to the trees. The safe ceiling with this tool is about 8 feet.

Pruning with the hand pruning saw required 6 minutes per tree. For general application it seems to be the most practical tool for trees of this size. It is the safest tool for this work, but one hazard is common to pruning with all three types of tools. This is the falling branch-butt which, in a plantation of long-limbed trees, may not simply fall, but after a short fall may bounce unpredictably. Goggles and a hard hat should be worn regardless of the type of tool used. Workers should also take care to see that all severed branches reach the ground.

In view of the objectives of this operation, all prunings were removed from the plantation and burned. Prunings were loaded into ½-ton and ¾-ton pickup trucks driven down the 16-foot alleys between blocks and hauled ¼ mile to the burning site. The time used to remove and burn prunings was 130-man and pickup hours, whereas the time required for pruning was 127 man hours for the 1,600 trees.

The writers conclude from this small operation, somewhat typical of plantation work, that the first pruning of rapidly growing ponderosa pine should not be postponed beyond the tenth year. At this time, shear pruning would be practicable, and the smaller volume and dimensions of prunings would make it unnecessary to remove them from the plantation, especially if only selected crop trees were pruned. These advantages of early pruning would seem to offset the disadvantage of having to prune the younger trees to a lower ceiling.

Geography of Commercially Important United States Trees[1]

William A. Dayton
Chief, Div. of Dendrology and Range Forage Investigations, U. S. Forest Service.

The tabulation presented in this article was made when the author was faced with the question of what proportion of the commercially important United States tree species occur in the East. It was made possible by the completion of the new Check List of Native and Naturalized Trees of the United States, including Alaska, prepared by Dr. Elbert L. Little, Jr., under the supervision of the Forest Service Tree Name Committee. In this check list, as in the 1927 one by the late George B. Sudworth, commercially important species are designated.

IN THE FOLLOWING LIST the species are primarily of commercial value for their wood, except that cascara buckthorn (*Rhamnus purshiana*) is of chief value for its medicinal bark. In the case of the two pinyons, chestnut, walnuts, and hickories (including pecan) important nut values are involved, and miscellaneous values (such as maple syrup and sugar, tanbark, naval stores, and ornamental uses) are also significant. The headings in the table refer to continental United States only; Canada and Mexico are referred to only in footnotes where the ranges of the respective species are somewhat at variance with the headings. The heading "Pacific States only," for example, might include species confined to California, say, or species which extend northward into British Columbia or Alaska or southward to Baja California.

[1]The writer thanks Mrs. Mary T. Motley of the Forest Service for aid in compilation.

TABLE 1.—OCCURRENCE OF COMMERCIALLY IMPORTANT TREE SPECIES IN THE UNITED STATES

Commercial tree species	Pacific States only	W. of 100th Meridian but not confined to Pacific	E. of the Mississippi River only	E. of the 100th Meridian but not confined to E. of Mississippi only	Widely distributed over U. S.
ABIES					
amabilis	x				
balsamea				x[1]	
concolor		x			
fraseri				x	
grandis		x			
lasiocarpa		x			
magnifica (incl. var. shastensis)	x[2]				
procera	x				
ACER					
negundo					x
nigrum			x		
rubrum				x	
saccharinum				x	
saccharum				x[3]	
AESCULUS					
glabra				x	
octandra				x	
ALNUS					
rhombifolia	x[4]				
rubra	x				
BETULA					
alleghaniensis				x	
lenta			x		
nigra				x	
papyrifera					x[5]
CARYA					
aquatica				x	
cordiformis				x	
glabra				x	
illinoensis				x[6]	
laciniosa				x	
myristicaeformis				x	
ovata				x[7]	
tomentosa				x	
CASTANEA					
dentata			x		
pumila				x	
CASTANOPSIS					
chrysophylla	x				
CATALPA speciosa				x	

TABLE 1.—(Continued)

Commercial tree species	Pacific States only	W. of 100th Meridian but not confined to Pacific	E. of the Mississippi River only	E. of the 100th Meridian but not confined to E. of Mississippi only	Widely distributed over U. S.
CELTIS					
laevigata				x	
occidentalis				x	
CHAMAECYPARIS					
nootkatensis	x				
thyoides			x		
CUPRESSUS					
arizonica		x			
FAGUS grandifolia				x	
FRAXINUS					
americana				x	
latifolia	x				
nigra				x	
pennsylvanica				x	
quadrangulata				x[8]	
GLEDITSIA					
triacanthos				x	
ILEX opaca				x	
JUGLANS					
cinerea				x	
nigra				x	
JUNIPERUS					
flaccida		x[9]			
monosperma		x			
occidentalis		x			
osteosperma		x			
scopulorum		x			
silicicola			x[10]		
virginiana				x	
LARIX					
laricina				x[11]	
occidentalis		x			
LIBOCEDRUS					
decurrens	x				
LIQUIDAMBAR					
styraciflua				x	
LIRIODENDRON					
tulipifera				x	
LITHOCARPUS					
densiflorus	x[2]				

TABLE 1.—(Continued)

Comercial tree species	Pacific States only	W. of 100th Meridian but not confined to Pacific	E. of the Mississippi River only	E. of the 100th Meridian but not confined to E. of Mississippi only	Widely distributed over U. S.
MAGNOLIA					
acuminata			x		
PICEA					
engelmannii		x			
glauca			x[12]		
mariana			x[12]		
pungens		x			
rubens			x		
PINUS					
attenuata	x				
banksiana			x[13]		
clausa		x	x		
contorta					
echinata				x	
edulis		x			
elliottii			x[14]		
engelmannii		x			
flexilis		x			
glabra			x[14]		
jeffreyi	x				
lambertiana	x				
monophylla		x			
monticola		x			
palustris		x[21]			
ponderosa (incl. *var.* arizonica)		x[15]			
resinosa				x	
rigida			x		
sabiniana	x				
serotina			x		
strobus				x	
taeda				x	
virginiana			x		
PLATANUS					
occidentalis				x	
POPULUS					
balsamifera					x[16]
deltoides				x	
fremontii		x			
grandidentata				x	
heterophylla				x	
sargentii		x[17]			
tremuloides					x[18]
trichocarpa		x			

TABLE 1.—(Continued)

Comercial tree species	Pacific States only	W. of 100th Meridian but not confined to Pacific	E. of the Mississippi River only	E. of the 100th Meridian but not confined to E. of Mississippi only	Widely distributed over U. S.
PSEUDOTSUGA					
taxifolia		x			
QUERCUS					
agricola	x				
alba				x	
arizonica		x			
bicolor				x	
chrysolepis		x			
coccinea				x	
douglasii	x				
ellipsoidalis				x	
emoryi		x			
garryana	x				
kelloggii	x				
laevis			x[19]		
laurifolia				x	
lobata	x				
lyrata				x	
marilandica				x	
michauxii				x	
muehlenbergii				x	
nigra				x	
nuttallii				x	
oblongifolia		x			
palustris				x	
phellos				x	
prinus			x		
shumardii				x	
stellata				x	
velutina				x	
Virginiana			x[19]		
RHAMNUS purshiana		x			
ROBINIA pseudo-acacia				x	
SABAL palmetto			x		
SALIX nigra				x	
SEQUOIA					
gigantea	x				
sempervirens	x				
SWIETENIA					
mahagoni			x		
TAXODIUM					
distichum				x	

(Table 1.—(Continued)

Commercial tree species	Pacific States only	W. of 100th Meridian but not confined to Pacific	E. of the Mississippi River only	E. of the 100th Meridian but not confined to E. of Mississippi only	Widely distributed over U. S.
TAXUS brevifolia		x			
THUJA					
occidentalis				x	
plicata		x			
TILIA					
americana				x	
caroliniana				x	
floridana				x	
heterophylla				x	
TSUGA					
canadensis			x[20]		
heterophylla		x			
mertensiana		x			
ULMUS					
alata				x	
americana				x	
crassifolia				x	
rubra				x	
thomasii				x	
UMBELLULARIA					
californica	x				
TOTAL NUMBERS	22	32	23	71	4

[1]Except for n.e. Alberta.
[2]Except for w. Nevada.
[3]Except for s.w. Manitoba.
[4]Except for Idaho.
[5]Except in the South.
[6]Except for some States in Mexico.
[7]Except for San Luis Potosi, Mexico.
[8]Except for a little westward overlapping into e. Montana, the w. Dakotas, and w. Nebraska and Kansas.
[9]Except Hidalgo, Mexico.
[10]Except Texas.
[11]Except for Minnesota and the Far North.
[12]Except for the Far North, including Alaska.
[13]Except for Minnesota.
[14]Except for s.e. Louisiana.
[15]Except for Tamaulipas, Mexico.
[16]Except in the South and w. Canada.
[17]Except for central Kansas and Nebraska.
[18]Except for the Southeast.
[19]Except for s. Texas.
[20]Except for e. Minnesota.
[21]Except for Louisiana and e. Texas.

Table 2.—Number of Commercially Important Tree Species Found in Regions of the United States

	Number	*Percent*
Tree species confined[1] to the Pacific States	32	21.05
Tree species native to west of the 100th Meridian but not confined to the Pacific States[2]	23	15.13
Tree species occurring east of the Mississippi River only[3]	71	46.71
Tree species east of the 100th Meridian but not confined to the area east of the Mississippi River[4]	22	14.48
Tree species widely distributed over the United States[5]	4	2.63
Total	152	100.00

[1]Except for 1 extending into Idaho and 2 into western Nevada.
[2]One each of these, however, extends into Hidalgo (Mexico), Tamaulipas (Mexico), and central Kansas and Nebraska, respectively.
[3]However, 7 of these extend into Louisiana or Texas, or both, and 2 each extend into the Far North (incl. Alaska), or Minnesota.
[4]Except for 4 species extending into Manitoba, Alberta, etc., and 2 occurring in some states in Mexico.
[5]Except for more southern parts of the country.

From this syllabus, containing the scientific names of 152 native United States trees, was derived the summary presented in Table 2.

It will thus be noted that, of the native commercially important trees of the United States, 54 (35.53 percent) are in the West, 94 (61.84 percent) in the East, and the remaining 4 (2.63 percent) are widely distributed. Of the 59 softwoods (conifers), 35 (59.32 percent) are western and 22 (38.98 percent) are eastern. Of the 93 hardwood (deciduous, broadleaved, or angiosperm) species, 18 (19.36 percent are in the West, 71 (76.34 percent) in the East, and 4 (4.30 percent) are widely distributed. The majority of our commercial conifer species occur in the West, and over three-fourths of our commercial hardwoods are eastern species.

Production and Quality of Pond Pine Seed in a Pocosin Area of North Carolina

Clemens M. Kaufman and Henry G. Posey[1]

Director, School of Forestry, University of Florida, Gainesville, and assistant professor, Department of Forestry, Alabama Polytechnic Institute, Auburn.

POND PINE (*Pinus rigida* var. *serotina* Michx. Loud.) forms one of the principal timber types in the coastal region of North Carolina where it extends over approximately 2 million acres. Because of its capacity to recover from fire injuries, its tolerance of wet sites, pond pine has gained increasing recognition as an important timber species for these pocosin areas.[2]

Until now, little has been known about seed and seeding characteristics in pond pine, other than that cone crops occur quite frequently and that abundant seedfall may be deferred several years because of the serotinous cones. Yet sound knowledge about seed production is one of the first requirements for successful regeneration. Because of the need for additional information, particularly in the phases relating to regeneration of stands by natural means, the authors undertook an intensive study of pond pine seed on the Hofmann Forest, a 79,000-acre tract in Jones and Onslow counties of eastern North Carolina. The purpose of this study was to determine the characteristics of good seed bearers and to obtain quantitative information on cone production, seed yield, and seed quality.

Materials and Methods

All cones in this study were collected during the fall and winter months of 1948-49 from felled dominant trees bearing good crops. Seventy-one trees were included in the sample, ranging by age at breast height in seven classes from 10 years and younger to 61 years and older. Each tree-age class was represented by 10 trees except the 31-40 year class which had 11 trees. On each of the 71 sample trees, all cones were counted and recorded separately as to whether they were sound, open, wormy, or dwarfed because of arrested development. Only the sound cones were saved, and these were separated into three classes on the basis of the year in which they matured, i.e., current or 1-year cones, 2-year cones, and 3-year and older cones. Separation into these categories was not difficult since the age of the cone could be determined by position on twig, color, and age of twig to which cone was attached. Between time of collection and germination tests, the separate cone lots were stored in open-top paper bags at room temperature for a period averaging about 7 months and not exceeding 8 months.

Before extraction, each age-lot of cones for each seed-tree was quartered down to a 10-cone sample which was used in determining lengths, measured to the nearest ⅛ inch, and in counting the number of seeds per cone. All cones were used in the instances where there were less than 10 cones per lot.

In the extraction process, the cones were first heated in a convection oven for 30 seconds or less at 167° to 169° C. to rupture the bract seals and dried at 45° to 49° C. for varying periods from 1 to 19 hours, until fully open. Seeds were extracted by tapping the inverted cones on a table top, then sealed in glass jars, and stored at 1° C. until germination tests were run some 8 months later.

For the 10-cone sample, seed counts were recorded separately for each cone. The seeds that fell out during the tapping comprised the extractable fraction; the cones were then hand dissected to remove the remaining seeds which were considered as non-extractable. The sum of these two fractions made up the total seed yield per cone, but only the extractable seed was used in the main determinations of seed germination and weight. A total of 1,668 cones were dissected, representing 69 of the 71 sample trees; on 2 trees the seed was extracted before the need for dissection became apparent.

Two random 100-seed samples from each available cone-age lot were selected, hand cleaned, and weighed to the nearest 5 milligrams. These two lots were used in the germination tests. Thirteen trees had no cones in one or more age groups and 18 others had too few cones in one or more age group to provide two 100-seed samples of extractable seed. Accordingly, statistical analysis of germination data was confined to the 40 trees from which a complete range of samples was obtained.

Germination tests were made in flats filled with a mixture of clean, sharp sand and sphagnous peat, with seeds covered to a depth of ⅛ to ¼ inch. The tests ran for a period varying from 60 to 80 days, at room temperatures, fluctuating from 40° to 85° F. Moisture was maintained near field capacity by sprinkling.

Results

Cone maturity and opening of cones.—Cones on pond pine mature early in September, but being serotinous, few of them open and release seed in the autumn in which they ripen. Young trees had only a small proportion of open cones, but more than a quarter of the cones on the oldest trees were open (Table 1). The opening of cones is stimulated by fire in any season of the year and by felling in the summer time. During hot summer days

[1] Formerly, professor of forest management and graduate assistant, respectively, School of Forestry, North Carolina State College. Contribution from the School of Forestry and the North Carolina Agricultural Experiment Station. Published with the approval of the Director as Paper No. 430 of the Journal Series.

[2] The term "pocosin" as here used refers to an extensive, flat, wet habitat with peaty or muck soil and usually remote from large streams of pronounced gradient.

large numbers of cones would start to open within a few minutes after trees were felled, provided the cones were exposed to direct sunlight, but the opening could be halted by lopping the branches and shading them. This reaction was common in cones of any age, but the current year's cones appeared to respond most readily. Felling did not stimulate cone opening in fall and winter months, nor in the cooler hours of summer days. Closed sound cones were seldom older than 5 years, but some open cones were found persisting for 10 or more years.

Considerable variation in ease of cone opening was observed between individual trees. This was particularly noticeable during artificial extraction in which it was found that preliminary heating at 167° to 169° C. for half a minute was sufficient to break the bract seals on even the most refractory lots. Some cone lots required less than thirty seconds for the heat treatment. Once the bract seals were broken, drying at 45° to 49° C. from 1 to 19 hours would suffice to open the cones more or less completely. Despite this wide variation the average drying time for all cone lots was only 5½ hours.

Cone production.—Pond pine begins to bear cones at an early age, with trees less than 10 years, at breast high, producing about eight cones per tree (Table 1). The youngest tree used in this study was only 4 years old.

Production increases rapidly until the trees are approximately 30 years old. Thereafter the number of sound cones levels off at 170 to 200 per tree. In the present study, the proportion of sound cones was found to average about 60 percent for all tree-age classes combined, ranging down from 92.3 percent for trees 10 years and younger to only 39.2 percent for trees 61 years and older. Relatively few trees less than 20 years old had all three age classes of cones (1-year, 2-year, and 3-year and older) on them, but in the 21-30 year group, and older, every tree bore at least a few of each of the three age classes of cones.

Table 1.—Average Production and Condition of Pond Pine Cones in Relation to Age and Size of Seed Trees

Breast high age classes	Sample trees	Age at breast height	Diameter breast high	Cones per tree	Condition of cones		
					Sound	Open	Wormy[1]
Years	*Number*	*Years*	*Inches*	*Number*	*Percent*	*Percent*	*Percent*
1-10	10	7.5	2.56	7.8	92.3	1.3	6.4
11-20	10	17.0	6.46	84.4	79.3	8.2	12.5
21-30	10	25.2	9.23	197.0	55.7	12.0	32.3
31-40	11	34.9	9.94	329.0	52.9	23.5	23.6
41-50	10	45.1	11.17	447.5	45.7	23.4	30.9
51-60	10	54.1	10.36	346.0	46.7	21.8	31.4
61 and over	9[2]	73.8	11.28	461.8	39.2	27.4	33.4
Mean	10	36.4	8.70	274.7	59.1	16.7	24.2

[1]Includes also dwarfed cones.

[2]One tree, an extremely unusual bearer with 2,142 cones, was omitted in computing the averages for this table. In subsequent data it is included since its distorting effect was only on cone production per tree.

In trees 30 years and below, cone production was proportional to either age or diameter. This relationship did not hold for the older age classes in which the trend between diameter and age tended to disappear. For example, the average diameters for the 41-50 year group and the 61 years and older group were nearly equal, but their average age differed by more than 28 years. However, these two groups had the largest average diameters, and were the most prolific cone bearers.

Table 2.—Average Number of Pond Pine Seeds per Cone in Relation to Tree-Age Classes

Breast high age class	Sample trees	Dissected cones	Seeds per cone
Years	*Number*	*Number*	*Number*
1-10	10	64	85.6
11-20	8[1]	173	73.4
21-30	10	281	75.0
31-40	11	302	75.6
41-50	10	280	83.5
51-60	10	286	78.3
61 and over	10	282	78.5
Weighted mean			78.7

[1]Seed from 2 trees in this age class had already been extracted when the need for dissection became evident.

Table 3.—Average Weight of 100-Seed Lots of Pond Pine in Relation to Age of Cones

Age of cones	100-seed Samples	Weight per 100 seeds
Years	*Number*	*Milligrams*
1	94	854.10
2	92	894.67
3 & older	89	931.12
Weighted mean		892.60

Least significant difference between means equals ± 60.56 milligrams.

Cone size, seed yield, and seed weight.—Individual cones ranged in length from less than 2 inches to over 3 inches. The longest cones had the largest number of seeds, but for some inexplicable reason, the shortest cones had more seed than did the next length class above them.

The number of fully formed or whole-appearing seeds per cone averaged 78.7. None of the mean differences between tree-age groups (Table 2) is statistically significant. Of the 1,668 cones dissected, only two cones, both of the current year's crop, were empty; 87 others, well-distributed through the three cone-age classes, had less than 20 seeds each. Seed yields per cone were highest in the 2-year age class, but none of the mean differences between cone-age classes proved significant.

The relationship between age of cones and weight of seed was found to be linear and positive, the youngest cones having the lightest seed (Table 3). The mean differences in seed weights are significant at the 5 percent level. Within the range of the data, the linear relationship between seed weight and cone age may be expressed by the equation, $Y = 64.48X + 763.64$, where Y equals the weight of 100 seeds in milligrams, and X equals the age of cones in years.

Seed weight was found to be independent of cone length and also of the quality of the seed year. The second-year cones had been produced in the best seed year, but the

seeds of this crop were intermediate in weight. The average weight of all seed lots was 892.6 milligrams per 100 seeds, indicating an average of 50,817 seeds per pound.

Germination or seed quality.—The quality of seed was about equal in all three cone age classes (Table 4). However, there were highly significant differences in germination percent between individual trees and tree age classes. On the average, about 44 percent of the apparently whole extractable seed germinated in 60 days and about 48 percent in 80 days.

The main germination tests were run only on the extractable portion of seed which comprised approximately 77 percent of the total seed yield per cone, or the proportion that could be obtained without dissecting the cones. Detailed germination tests were also made on the seeds that could be obtained only by dissecting the cones. This fraction, approximately 23 percent of the total seed yield, was classed as non-extractable, and in quality it averaged very nearly the same germination per cent as the larger, extractable portion (Table 4).

For some seed lots, the cotyledons began to emerge within a week of sowing but there was a wide variation in germinative energy by individual trees and by tree-age classes.

As might be expected, the germination percentage increased with seed weight, ranging from 29 percent for seeds weighing 501-600 milligrams per 100 seeds to 65.3 percent for seeds weighing over 1,200 milligrams per 100 seeds. Since no cutting tests were made, the observed trend doubtless reflects the differences in proportion of blind and spoiled seed in the different lots.

Discussion

Most of the difficulties and advantages encountered in the regeneration phases of managing pond pine center around the serotinous nature of the cones.

Practically all sound cones of pond pine appear to open within 5 years after they ripen in any given September. It is not certain, as determined from the present study, to what extent this time limit had been affected by past fires. Few seeds are released in the autumn of the year that cones mature. This deferred seedfall complicates seedbed preparation and harvest cuttings.

Only summertime logging appears to provide conditions which will cause rapid opening of cones on felled trees. This indicates that logging alone is not enough to insure establishment of well-distributed stands of new seedlings. It may well be that main dependence on securing satisfactory dispersal of seed must be placed on properly timed use of fire.

Although cone production begins at an early age, small, young trees are not adequate seed bearers. It appears that the minimum size for pond pine seed trees should be 9 to 10 inches in diameter and 25 to 30 years old at breast height.[3]

Pond pine is a prolific cone bearer, producing some new cones practically every year. Since a liberal supply of older cones is almost always present on seed trees, the problem of seedfall becomes mainly one of timing the release of seed. Seed in all old sound cones is apparently as good as those in newly matured ones. These characteristics make planning for regeneration of pond pine independent of good seed years.

Good seed trees may be expected to average at least 170 sound cones per tree. Each good seed tree should release about 5,000 germinable seed. Since data on the ratio of expected number of pond pine seedlings to amount of fallen seed are not yet available, it is not known how many seed trees should be reserved per acre to insure adequate regeneration. With a good seedbed and favorable weather during and following germination, about 25,000 to 30,000 seed per acre should, however, suffice for reasonably good initial stocking.

[3]Because the majority of pond pines in some stands may be of sprout origin, ring counts on stems may not be a reliable index of the physiological age of the tree. Seedlings on poorly drained sites have been found to require as long as 10 to 12 years to reach breast height, but sprouts, following fire, frequently attain this height in 1 year. Kaufman et al. (unpublished manuscript) in a study of pond pine growth on the Hofmann Forest used an average of 4 years as the time required for seedlings to reach breast height.

Summary

Cones from 71 dominant pond pine seed trees, ranging in age at breast height from less than 10 to over 60 years, were collected in the Hofmann Forest in Jones and Onslow Counties, North Carolina, in the dormant season of 1948-49.

The average seed tree over 30 years old at breast height was found to bear 175 to 200 sound closed cones. Each cone averaged 75 to 80 seeds, with an average germination of 43.9 percent in 60 days.

Practically no sound closed cones older than 5 years were found on these sample trees. The seed from old cones were as good as those from newly matured ones.

Seed weight increased with cone age in a linear relationship without regard to quality of seed years. Average weight of 100 seeds was 892.70 milligrams. Based on 275 individual 100-seed lots, the indicated average number of pond pine seeds per pound was 50,817.

TABLE 4.—AVERAGE GERMINATIVE CAPACITY OF POND PINE SEED IN RELATION TO AGE OF CONES

Germination period	Sample trees	Germination: Extractable seed, Cone age: 1 yr.	2 yr.	3 yr.	All ages	Non-extractable seed: All ages
Days	*Number*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
60	40	44.7	41.9	45.3	43.9	42.7
80	20	48.2	44.4	50.2	47.6	44.8

The Periodic Inventory in Forest Management—A Specific Example[1]

Walter H. Meyer
School of Forestry, Yale University, New Haven, Conn.

THE FOREST INVENTORY has a dominant and well-deserved place in forest management. In the preliminary stages of development a rapid and relatively inexpensive reconnaissance will often suffice to start the forestry operation on a fairly sound footing, but with the advance in development of silvicultural practices and of intensity and variety of utilization practices, a more thorough inventory is soon needed. A periodic reinventory therefore becomes of prime importance to effective management. Since only a few operations in the United States have reached the stage where the periodic inventory has become routine practice and consequently, since this procedure is fairly new in our American experience, the story of the objectives and methods of an actual case is in order. On the Crossett Lumber Company lands the decadal survey has been accepted as a necessary instrument for successful forest management.

The Crossett Lumber Company was first organized in 1898 in the then virgin loblolly-shortleaf pine forests of southern Arkansas. It soon became a large operation, with an annual cut of about 100 million board feet. Although the operation was on a liquidation basis during the early stages, economics forced upon it a diameter limit cutting and consequently the leaving of a nucleus of growing stock on the cutover lands. An early interest in the capacity of cutover lands to produce new supplies of timber culminated in action in 1922, after a reconnaissance cruise by Professor H. H. Chapman. Among other things he stated that over four million dollars would be lost during the course of the next thirty years, if no attention was paid to protection from fire. A technical forester and a technical forestry crew were hired to put protection into effect, to make a survey of the cutover lands, and to initiate growth studies. By 1929, the survey results were complete enough to permit Professor R. C. Bryant, then acting as forestry consultant, to make specific recommendations which would later lead to sustained production. These consisted largely of reducing the annual cut of pine sawlogs, the erection of a pulp plant to take care of thinnings, tops, and nonsawlog materials and of a chemical plant to handle low-grade hardwoods. As a result the budgeted cut for the period 1929 to 1939 was reduced to 30 million feet of pine and 25 million feet of hardwood; the chemical plant came into production in 1931; and the pulp and paper plant in 1937. The 1922 reconnaissance and 1929 inventory and analysis even though elementary in many respects had, therefore, a profound effect on the company's operations.

In 1939, a complete inventory was made under the general direction of Professor Chapman, covering the entire company holdings, which by that time had increased in area to about 450,000 acres, owing to the policy of retaining all cutover lands, as well as acquiring cutover lands from other liquidating owners. At that time, the company was firmly established in its forestry program, the lands being divided into five districts, each under the supervision of a technical forester or a competent man who had grown up in the company's forestry activities. Selection cutting had become the rule. Protection was well organized. The survey was made on a .625 percent basis and was designed to give the basic information for establishing a sound cutting budget for the next ten years and for predicting the growing stock status at the end of the period.

In 1949, the second intensive inventory was made. Thus Crossett has had three general inventories, excluding the usual purchase cruises and the 1922 reconnaissance, pointed at management control. It plans to repeat them at decadal intervals.

Objectives of the Reinventory

The 1939 and 1949 inventories were designed for over-all management and long-term planning and not for the detailed day-by-day management practice. For the first purpose, an instantaneous comprehensive picture is needed and consequently a low percentage cruise is acceptable and necessary. For the second purpose, a more intimate picture is necessary, involving a higher percentage cruise of the areas operable under the next year's cutting plan.

A survey of the first kind has at least five major objectives:

1. It reveals the changes that have taken place in the past decade as a result of the adopted practices.
2. It establishes the accuracy of the prediction of forest development and growth.
3. It supplies the information on which to base the cutting budget for the next decade.
4. It furnishes the basis for growth prediction and future progress in stand development.
5. It provides a storehouse of information on which to base policy decisions made necessary by changes in utilization practices and by improvement in forest management practice.

One or another of these objectives may dominate from the point of view of overall company management and development; others from the point of view of forest management.. Since these in turn affect the methods and procedures used in the survey, a conflict results which has to be resolved before the survey can be made. A prime case in point touches upon utilization standards. During the decade 1939-1949 sawlog utilization standards in pine had improved mark-

[1]Paper presented at a meeting of the Division of Forest Management, Society of American Foresters, Biloxi, Miss. December 14, 1951.

edly. Should the new survey be made in conformance with the new and more intensive standards as of 1949 to give the best foundation for analyzing future operation, or should it be based on the lower standards of 1939 to give the best basis for checking on past work? This question was resolved by the company's board of directors which had to be convinced that the foresters knew their job of growth prediction and stand development. It was stated that the entire success of the company, the whole program of investment and industrial development, depended upon the accuracy of these predictions. The new survey, therefore, had to be based upon the outdated standards of 1939, with a supplementary study included to convert the values to terms of the 1949 standards when such was necessary. The first two objectives noted above therefore dominated the picture.

A second decision, also quickly resolved, was whether to job out the project to an outside consultant firm, which had the personnel, equipment and experience to do an efficient job or whether to contain it within the company's organization. (I have always maintained that whenever a company has the requisite personnel, it should do the job itself, even if it interferes with the usual heavy work program and may not be done as efficiently as desired.) By this time the Crossett Company employed well over 20 foresters, who had the duty of controlling *all* activities from the delivery points at the manufacturing plants out through the woods. Among these jobs were raw material procurement and delivery, forest management, silvicultural practices, marking, cutting contracting, land control, fire control, road and bridge development, mapping, and so forth, a truly big job fully occupying their time. Despite this, the added job of making the inventory was placed upon their shoulders. The decision was fully vindicated, since many additional values were obtained other than those coming from the cruise itself. The district foresters gained greater knowledge of their areas by going over it methodically within a short period of time, a knowledge which would be continually helpful in their future work. It proved possible to obtain an intimate correlation between the kind of data gathered and the desires of management, which would probably not have been possible if an outside firm had done the job. It built up a great backlog of information which could be drawn upon, and is being drawn upon repeatedly, for new studies and analyses. And finally, it was done at a cheaper total cost.

Preliminary Stages

In the following discussion it will be quite difficult to strip off the detail from the major considerations, but an attempt will be made to do so, although it will make an incomplete story. The effective prosecution of detail is, after all, just as important as the framing of the major procedures.

Before the inventory could be started several preliminary steps had to be taken. The first of these was to develop a foundation of good maps. The existing maps were incomplete and inaccurate. If good maps were available, not only would the efficiency of the cruise be increased but that of every-day job performance. The entire gross area, about one million acres, was flown and photographed. The company photogrammetrist prepared the maps. Full dependence upon an aerial survey would, of course, have eliminated the possibility of satisfying the two major objectives of checking on past stand growth and development. To meet these objectives it was necessary to repeat exactly the techniques of the previous cruise. However, an aerial cruise *was* actually made, but as an independent project, designed chiefly for checking the comparative results of the two types of cruises and for determining what elements of an aerial cruise could be used to perfect the next cruise scheduled for 1959.

Another important preliminary action was to reconstruct in fine detail the cruise methods that were used in 1939. Fortunately, one of the men who had been on the 1939 cruise was still in the employment of the company and the forester who had control of the 1939 job was available for temporary assistance. The old methods were therefore thoroughly re-established, although somewhat refined from the original pattern, yet not departing from it, to give more and better information. The exact method of cruising, the exact specification standards, the same volume tables were adopted. Type classification was slightly modified with more precise definitions, yet fitting into the old pattern. One major change was made, namely in the percentage of cruise. In 1939, there were five districts, now there were ten. To get the approximate same relative accuracy of information by districts, the percentage of cruise was therefore doubled to 1.25 percent, or one mile of line plots for every 8 forties, rather than for every 16 forties as was formerly the case. Another change was to make the cruise more intensive to obtain information on the *entire* forest resource, including reproduction, pole-sized timber, sawlog timber, non-sawlog trees, cull trees, mortality, cutting history, etc.

The third preliminary action was to train all the company foresters and crews. Too much attention cannot be placed on this phase. The training period was intensive and the crews were not placed on the job until it was felt that all operated under precisely the same standards. Control was not dropped at this point, however, since during the course of the survey, inspection officers met with each of the crews at least twice a week for the purpose of correcting any aberrations that might arise.

The Inventory

Each district forester was responsible for his area and personally did the estimating except in a few instances where he was overcrowded and was furnished a com-

petent assistant. The work started as soon as the annual flood waters receded from the bottomlands, and within a little over two months' time the field work was completed. A total of 26,504 quarter-acre plots, or about 1,656 miles of line, were covered before the job ended.

Lines were run in cardinal directions, one mile for every 8 forties. The basic plot was a quarter-acre circle spaced at 5-chain intervals. Merchantable-sized trees were measured on the entire plot and submerchantable trees on a reduced plot within the large plot. Reproduction was estimated on a block of four quadrats at the center of the plot by the stocked-quadrat method. Trees were classified by species or species groups, by diameter, log height, and sawlog character. Cull trees and dead trees were also tallied. Every fourth plot was the nucleus for growth measurements, all trees being bored and described within a restricted radius from the plot center.

Change in utilization standards as between the two dates of inventory has previously been mentioned. Since the reinventory was based on 1939 standards, adjustment factors were developed by a special spot cruise superimposed on the regular cruise. A single competent cruiser was charged with this responsibility. He went from crew to crew as the job progressed, took an independent tally of each plot in the day's run according to 1949 standards, checking in with the regular crew as to the diameter and number of trees tallied and then making a comparison. The various forest types gave different results, with an approximate average for the entire pine volume of about 16 percent increase, ranging as high as 30 percent or more under certain conditions, for example, rough old-field types. This increase in volume applied to sawlog volume and not to total volume utilized. In an integrated operation of the kind under discussion, where raw material not suited for the sawmill is diverted to the pulp mill, little change in total cubic volume utilized would be expected. The increased sawlog volume consisted of top logs previously too rough to be classified as sawlogs but now acceptable, and entire trees of rougher types, also previously unacceptable. Under less favorable lumber market conditions than those prevailing in 1949, the high percentage of overrun will probably decrease again.

Initial Computations

The completed tally sheets were sent to the main office at close intervals. Here a corps of computers (starting with two persons, ending with six) made the volume computations and entered the data on a set of master forms. One set of forms dealt with the stand and stock tables, recognizing forest type, operability class and district, another set with growth values, a third with mortality counts, etc. None of the tabulations could be summed, of course, until the final entry was made. Following the summary, the per acre values were found. Stock and stand tables were then available for every forest type and district, further combined into every forest type for all districts and for various type combinations for the forest as a whole. Growth rates were averaged out, plotted, and combined into the most effective groups of types and species. The office work was completed within two or three weeks after the last cruise plot was measured.

Final Computations

The important phases of the final computations can be bracketed under the several following headings. Throughout all interpretative stages, heavy dependence is placed on the stand and stock tables.

1. *Areas and volumes.* The proportionate number of plots taken within a forest type multiplied by the total area, gave the area in the type. This in turn multiplied by the average volume per acre gave the volume for the type. A separate subtotal had to be maintained so that the areas acquired since 1939 were kept apart to make the 1939-1949 comparison valid.

2. *Analysis of past stand development.* The stand and stock tables and the type and district volumes gave the basis for analyzing the results of past management. The changes in numbers of trees, volumes, and basal areas by forest types and districts showed clearly those types or conditions which had lagged behind in general development. They pointed out the "sore spots," which would require future attention. The second major use of these tables was for predicting growth and for calculating and allocating the next 10-year cut.

3. *Diameter growth rates.* The growth plottings were first analyzed for acceleration or deceleration. It appeared that deceleration or acceleration rate bore no relation to diameter and hence one average rate was derivable. Pines showed definite deceleration, varying between major type groups; hardwoods showed definite acceleration. Obviously the southern hardwoods resemble their more northerly kin, in that they are able to take advantage of increased growing space, resulting from selective cutting, faster than the conifers. Smoothed growth curves for the coming 10-year period adjusted for acceleration or deceleration were the final product of this phase.

4. *Mortality trends.* The analysis of the dead tree tally, showed that mortality in pine expressed in percentage of the number of trees in a diameter class, was highest in the smallest sizes and gradually decreased with size class. With hardwoods, however, the reverse was true. On the whole, the hardwood mortality rate exceeded that of pine.

5. *Volume growth rates.* The curved adjusted growth values applied to the type stand tables, appropriately reduced for mortality, gave first the distribution of trees by diameter class as of 10 years hence and then the volume by diameter class and whole stand (assuming no cutting would be made). Such determinations were made for the separate types and districts,

singly and in combination, and in terms of board-foot volume and cubic-foot volume.

6. *Calculation of allowable cut.* The method of regulation used conformed to the principles of horizontal cut. In essence this is a calculation somewhat similar to the above for growth rates, and consists in setting up the stand condition as of 5 years hence, then subtracting out the volumes of trees to progressively lower diameter limits and finally extending the residual stand table to a time 10 years hence. Thus horizontal cut assumes that the larger trees will be cut and that a minimum diameter limit will be observed in marking. This is quite contradictory to the actual practice under the selective system, where all sizes of trees may be taken, depending upon their vigor and quality. Off-hand one could conclude that serious discrepancies between predicted growth and actual attainment would result. However this method was used in 1939. The 1949 check brought out satisfactory conformance. The actual volume at hand in 1949 was within 4 percent of that which was predicted 10 years before to be on hand. This discrepancy is not caused by the method of calculation alone. The calculations, raised to district totals, gave the basis for deciding how heavily the stands could be cut and what effect the cut would have on the total volumes available 10 years from now. The cutting budgets for the districts took into account the nature of the local conditions and hence varied somewhat so far as percentage of cut was concerned.

7. *Calculation of allowable cut of pulpwood.* This calculation determined first the maximum amount of pulpwood that could be cut without depleting the young growing stock, assuming also that all non-sawlog (that is "rough") pine could be removed in 10 years' time and that all tops would be converted to pulpwood. This maximum estimate was then scaled down, after examination of the conditions in the various districts, to a practical attainable level. No effort was made to allocate the annual cut in place. This is properly in the realm of day-by-day management and is taken care of in the annual plan.

8. *Reports.* The final reports summarized the essential information, drew conclusions from the presented statistics, and then recommended a narrow range of annual cuts that would be feasible, together with their resultant effects on stand development. Recommendations for change in silvicultural methods or other forestry procedures were also an essential part of the report.

General Conclusions

1. The predictions made in 1939 were adequately supported for pine. The cruised volume of 1949 was only about 4 percent off that predicted in 1939. This is a vindication of the horizontal-cut calculation, even though the actual cutting operation was on a tree selection basis without regard to a precise minimum diameter.

2. Stand development as pictured in the comparative stand tables was satisfactory with larger numbers of pine trees in each diameter class up to about 24 inches, following which there was a decrease.

3. No prediction was made of hardwood volume growth in 1939, but the comparative statistics revealed a serious discrepancy. The 1949 cruise is considered the best one, with the 1939 cruise in error, owing to the relative inexperience of the cruisers as far as hardwood was concerned.

4. The more complete and detailed inventory of 1949 gives a splendid basis for further policy determinations and study. For example, the tally of cull trees and non-sawlog trees (not carried in 1939), indicate the necessity of stand improvement practices and their cost by forest types for the separate districts. The relative abundance of hardwood cover in all types shows directly the need for strict attention to stand development to favor pine and bring it in in heavier proportions. A positive hardwood program was stimulated as a result of the survey.

5. The periodic inventory has demonstrated its worth in effective forest management and has a fixed place in the operations of the Crossett Lumber Company: (a) to check on past mistakes; (b) to perfect current practices; (c) to determine the cutting budget; (d) to predict the effect of cutting on the development of the forest resource; and (e) to provide the basic data for new developments.

Notes

The Relation of Growth to Severity and Season of Pruning Open-Grown Loblolly Pine

Early pruning in young, open-grown stands of loblolly pine is a measure that can greatly increase future lumber quality yield. Although severity of pruning can cause a significant reduction in the rate of diameter growth following pruning, the effect of season of year when pruning is done is not so apparent. Height growth rate is not appreciably affected by either severity or season of pruning.

Pruning Treatments

In 1945, a study was installed at the Hitchiti Experimental Forest, near Macon, Georgia, to determine the effects of pruning open-grown loblolly pine. Four treatments were applied in an old-field stand, 10 to 15 years in age.

Treatment 1—pruning to $\frac{2}{3}$ total height in summer (July).

Treatment 2—pruning to $\frac{1}{2}$ total height in winter (November).

Treatment 3—pruning to $\frac{1}{2}$ total height in summer.

Treatment 4—no pruning.

The objective was to prune in two or more operations and maintain the live crown at one-third or one-half the total height until a clear 17-foot log was obtained.

Design of Study

The treatments were replicated in eight blocks, each block with four randomized plots, and each plot 0.1 acre in size. On each plot 10 to 15 well-spaced crop trees were selected, and trees offering serious competition to the crop trees were removed. The selected trees in each treatment ranged from 2 to 6 inches in diameter breast height with the majority near the average of 3.5 inches; total height range was from 12 to 20 feet with the majority near the average of 17 feet.

Pruning was commenced in the summer and winter of 1945 and, in order to maintain the live crown at one-half and one-third total height, repeat prunings were made in 1948 and 1950. Initial diameter and height measurements were taken in the winter of 1945 and annually thereafter from 1946 to 1951, inclusive.

FIG. 1.—An old-field stand of young, open-grown loblolly pine in the southern Piedmont. Pruning is required if further quality yield is expected.

Effect of Pruning on Height and Diameter Growth

The average annual diameter and height growth of the pruned trees for the 6-year period are given in Table 1.

TABLE 1.—AVERAGE ANNUAL DIAMETER AND HEIGHT GROWTH OF OPEN-GROWN LOBLOLLY PINE PRUNED BY SEVERAL TREATMENTS

Pruning treatment	Average annual growth	
	Diameter	Height
	Inches	*Feet*
$\frac{2}{3}$ total height—summer	0.52[1]	2.9
$\frac{1}{2}$ total height—winter	0.58[1]	2.9
$\frac{1}{2}$ total height—summer	0.64	3.1
No pruning	0.66	3.2

[1]Significantly lower than control at 1 percent level.

All of the pruning treatments except half-height summer pruning resulted in a statistically significant reduction in diameter growth in relation to the growth of unpruned trees. Furthermore, all of the differences among the three actual pruning treatments were significant at the 5-percent level. If measurements had been made at the time of pruning, summer and winter, it is doubtful that a real diameter growth difference would exist between half-height summer and winter pruning.

There was a slight difference in height growth (0.1 to 0.3 feet) in favor of the unpruned trees, but this difference was somewhat less than that required for significance at the 5-percent level.

Discussion

From a growth standpoint, pruning open-grown loblolly pine to two-thirds total height is too severe. On the average, however, smaller branches are cut than in half-height pruning, and a smaller knotty core is left on the tree.

The difference in growth rates when pruning half-height in winter or summer seems attributable in part to the timing of the diameter measurements. Jackson[1] has shown that about 70 percent of the seasonal diameter growth of shortleaf pine, near Athens, Georgia, has occurred by July. Since the summer pruning was done in July, it is reasonable to assume that these trees make a partial recovery in the growth period following pruning and enter the next growing season with a greater leaf surface area than the winter-pruned trees. The effect of season of pruning on growth is not considered to be of as much importance as its effect on such things as pruning time per trees, labor availability, and susceptibility to insect attack.

Cost differences between half-height and two-thirds height pruning are considered to be negligible. Pruning two-thirds height will produce a 17-foot clear log when the tree is only 25 feet tall, while half-height pruning is not completed until the tree is 34 feet tall. In this particular study, in order to maintain the live crown at the desired level, the trees were pruned every two or three years after the stand attained an average total height of 17 feet. On this pruning schedule, two or three operations are required to clear one log when pruning to two-thirds total height,

[1]Jackson, L. W. R. Effect of littleleaf disease on growth of shortleaf pine. Jour. Forestry 49:778-779. 1951.

and three or four operations will be required for the half-height pruning. However, Bull[2] shows that in pruning open-grown longleaf, one extra operation adds very little to the total cost of pruning a tree to a fixed height.

T. A. MCCLAY,
Southeastern Forest Experiment Station.

Volume Tables for Stumps

Foresters are quite frequently called upon to determine the volume of portions of stumps in excess of heights specified in timber sale contracts. In such instances, stump volume tables would obviously be very helpful. To meet this need, the authors have developed board-foot and cubic-foot volume tables for excessive stump heights. The board-foot tables are based on the International ¼-inch, the Scribner, and the Doyle log rules. Cubic-foot volumes are determined by considering the stump as a cylinder. These tables are available, in processed form, from the School of Forestry, North Carolina State College, Raleigh, but for those who might be interested, the procedures for constructing the tables are briefly outlined here.

For each of the three log rules, the respective basic formulas are employed, the main feature being the computation of volumes for different stump diameter classes progressively by one-inch additions to stump height.

For the International ¼-inch log rule, the volume of a one-inch section is found by dividing the basic formula for a 4-foot section, $V = (0.22D^2 - 0.71D)\ 0.905$, by 4×12, resulting in $V = \left(\frac{0.22D^2 - 0.71D}{48}\right) 0.905$, or simply $V = 0.004145D^2 - 0.0134D$.

Then, for example, the volume of a one-inch section of a stump 15 inches in diameter can be computed, as $V = (0.004145 \times 225) - (0.0134 \times 15) = 0.73$ board feet. A two-inch section having the same diameter would have double this amount, a three-inch section triple this amount, and so on.

In the event that one finds it necessary to extend the table beyond 48 inches of excessive stump height, the 48-inch value would be added to that of a diameter one-half inch larger in order to consider the increasing taper of the next four-foot section below. For example, the volume of a stump 40 inches in diameter and containing an excessive height of 53 inches would be:

$$\begin{aligned} V &= (48 \times 6.09608) + 5\ (0.004145D^2 - 0.0134D) \\ &= (48 \times 6.09608) + 5\ (0.004145 \times 40.5^2 - 0.0134 \times 40.5) \\ &= (48 \times 6.09608) + 5\ (0.004145 \times 1640.25 - 0.0134 \times 40.5) \\ &= 292.61 + 31.28 \\ &= 323.89 \text{ board feet.} \end{aligned}$$

For the Scribner log rule, the volume of a one-inch section is found by dividing the basic formula developed by Bruce and Schumacher[1] for 16-foot logs, i.e., $V = 0.79D^2 - 2D - 4$, by the product of 12×16 which simplifies to $V = 0.00411D^2 - 0.01042D - 0.02083$. For a log 15 inches in diameter and one inch long the volume would be calculated as $V = 0.00411 \times 225 - 0.01042 \times 15 - 0.02083 = 0.75$ board feet.

The values for each diameter and excessive stump height class are then computed, as in the case of the International ¼-inch rule, except that no account of taper need be considered, regardless of stump height.

Similarly, for the Doyle rule, the formula $V = \left(\frac{D-4}{4}\right)^2 L$, is modified for one-inch sections merely by substituting $\frac{1}{12}$ for log length, L, which simplifies to $V = \left(\frac{D-4}{4}\right)^2 0.0833$. A stump section 15 inches in diameter and one inch long would be calculated as $V = \left(\frac{15-4}{4}\right)^2 0.833 = 0.63$ board feet.

As taper is not considered in the construction of the Doyle rule, no correction need be made for added length.

Cubic-foot volumes are determined for one-inch sections for varying diameters and lengths. The stump sections are considered as cylinders having an average diameter equal to the small end of the stump. However, the tables may be used in their present form to allow for increase in volume with taper. Merely substitute an average stump diameter taken other than at the small end, and read the volume corresponding to the length.

Stump volume tables may be used in two ways: (1) to show the volume of entire stumps, or (2) to show the volume of portions of stumps above the height specified. In the latter case the penalty scale for a stump 22 inches high, 21 inches in diameter, having an allowable height of only 10 inches, would be 18.6 board feet, according to the International ¼-inch log rule. This volume is determined by subtracting the allowable 10 inches from the total 22-inch height and finding the volume for a stump 21 inches in diameter with an excessive height of 12 inches.

J. ATWOOD WHITMAN,
Consulting Forester, Glendon, North Carolina
and
GEORGE K. SLOCUM,
Associate Professor of Forestry, North Carolina State College, Raleigh.

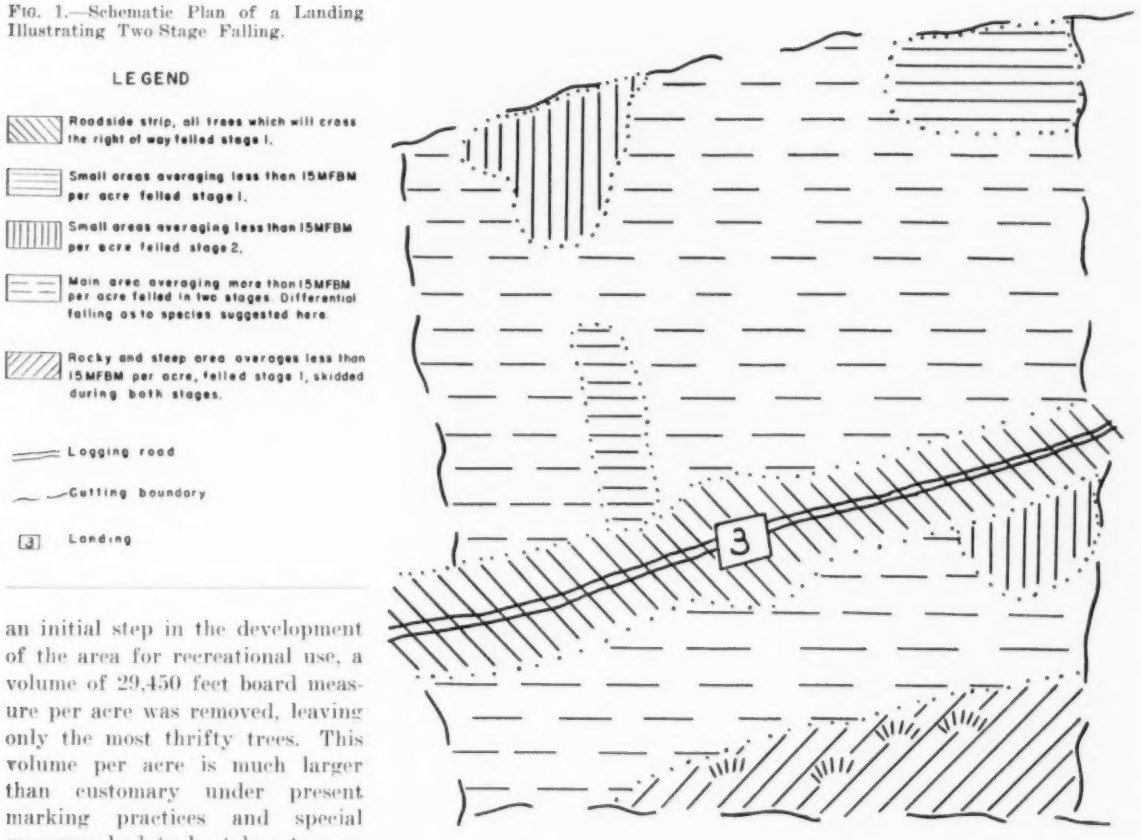
Two-Stage Falling in an Overmature Stand

Two-stage falling was proposed as a means of reducing logging damage, to the reserve stand, on a Forest Service timber sale on the Eldorado National Forest. The stand consisted of an overmature Jeffery pine-white fir-red fir type averaging 43,437 feet board measure, Scribner scale, to the acre. As

[2] Bull, H. Pruning practices in open-grown longleaf pine in relation to growth. Jour. Forestry 41:174-179. 1943.

[1] *Forest Mensuration.* 2d Ed. 1942 McGraw-Hill Book Co., Inc., New York.

Fig. 1.—Schematic Plan of a Landing Illustrating Two-Stage Falling.


LEGEND
Roadside strip, all trees which will cross the right of way felled stage 1.
Small areas averaging less than 15MFBM per acre felled stage 1.
Small areas averaging less than 15MFBM per acre felled stage 2.
Main area averaging more than 15MFBM per acre felled in two stages. Differential falling as to species suggested here.
Rocky and steep area averages less than 15MFBM per acre, felled stage 1, skidded during both stages.
Logging road
Cutting boundary
3 Landing
3

an initial step in the development of the area for recreational use, a volume of 29,450 feet board measure per acre was removed, leaving only the most thrifty trees. This volume per acre is much larger than customary under present marking practices and special measures had to be taken to protect the reserve stand.

The first problem to be considered was the appropriate method to use in marking the area. Whether to: (1) mark the timber in two stages, (2) mark the timber once using distinctive marks for the first and second stage, or (3) mark all of the timber at the one time.

Adoption of either of the first two methods would require the marker to exercise judgment for each tree which is more properly the prerequisite of the timber faller. Namely, to judge the lean of each tree, the lay of each tree with respect to other marked trees, and the number of trees necessary to approximate one-half of the total cut. This would add greatly to the time required to mark the area. The problem was discussed with the timber fallers who strongly preferred to select their own trees for the first stage. Accordingly the third method was used, and the timber fallers instructed to fall about one-half of the marked volume during the first stage.

A further step would be to practice differential falling with respect to species. The most valuable species (Pine) should be felled first because: (1) Maximum care could then be taken not to cross trees in falling. (2) Fir usually contains a higher percentage of cull than pine; therefore reserving as great a percentage of fir as possible for the second stage. Fewer cull trees would then interfere with the cats while the skidding pattern was being established in the first stage, or interfere with the timber fallers in the second stage. (3) Cull or sanitation trees of either species should be felled during the second stage.

It is essential for two-stage falling that setting boundaries and landings be carefully laid out in advance. The bull buck and cat boss must cooperate with the forester in laying out each setting, and adhere to the general plan in directing the men under them. Once timber has been felled and pointed to a particular landing it should not be skidded to a different landing. When this is done, uncalled for damage usually occurs to the reserve stand as a result of skidding logs in a direction contrary to the lay of the down timber. Within the scope of a single setting, sub-units frequently occurred on which the volume was low enough to fall all the trees at the one time. It was necessary, however, to balance the total volume of each setting so that a proper proportion between long and short skidding could be maintained during both stages. The bull buck should supervise the fallers here.

No records were kept to determine if there is additional cost of skidding which resulted from two-stage falling. It is doubtful if costs were materially increased because the average daily scale

loaded at the landing did not vary appreciably between single stage and two-stage falling. The main cost to the operator then results from having to move the loading equipment back to a landing for a second time. This is largely a matter of lost time, and may be reduced by leaving the landing rigged for the return, or by use of a shovel type loader.

Conclusion

The gains from two-stage falling may be briefly summarized:

1. Better marking results as the marker can check the leave trees more efficiently after the stand is partially opened up.

2. The method appeals to the timber fallers as it is less difficult to avoid crossing and breakage of felled timber; bucking is facilitated.

3. Less damage occurs to the reserve stand as approximately the same lays can be used twice, and during the second stage the skidding pattern is clearly defined.

4. Less damage results from skidding due to the greater mobility on the part of the cats, which enables the operators to work out a proper balance of laterals to main skid roads.

RICHARD C. SIAS,
Formerly sales officer on the Pacific District of the Eldorado National Forest. Now Forest Technician, Southern Pacific Company, San Francisco.

Hurricane Break in New England Conifers

The article entitled "Compression Failures in the Boles of Living Conifers," by Mergen and Winer in the September 1952 JOURNAL recalls the "Hurricane Break" found in the N.E.T.S.A.[1] lumber in 1940.

FIG. 1.—Hurricane break in planed white pine which was not apparent in the rough board.

The writer was of the opinion that the high winds had whipped the trees to such an extent that stresses had occurred which fractured the fibers. The scalers were instructed to watch for signs of this fiber break. None was discovered. When the timber was being sawed the graders were cautioned to be alert to any evidences of this break. Careful and diligent search did not reveal any cases. Nevertheless, the writer was of the opinion that such fractures had occurred.

In the spring of 1940 when some of the seasoned lumber was being sold and shipped this fracture was discovered when the lumber was surfaced (Fig. 1). The rough boards indicated no fractures of the fibers but the planed boards clearly revealed the fractures. We termed this condition "hurricane break," for lack of a better name.

This condition was first discovered when loading out a car of surfaced boards in Rochester, N. H., in 1940. It was not found all over the hurricane area but in certain areas it was quite pronounced. The overall degrade was only about 1 percent but in some sites and yards the degrade amounted to about 10 percent.

Careful examination of logs and the rough lumber gave no indication of this condition. Minute examination of rough boards did reveal evidence of the fractures of the fibers but such minute examination was not feasible.

In N.E.T.S.A.'s official report issued by the United States Forest Service in February 1943, the following is quoted from items 7 and 8, page 591, Appendix 136:

(7) Windbreak, i.e., lateral fracture, was very difficult to detect in rough lumber on a traveling chain, particularly when it was of a light or moderate character.

(8) Because of windbreak, 4.23% of 4/4 No. 1 and No. 2 common volume dropped to No. 4 common after planing, and 0.42% to No. 5 common; 3.21% of 4/4 No. 3 common volume fell to No. 4 common, and 0.14% to No. 5 common; and 0.52% of the 4/4 No. 4 common volume dropped to No. 5 common. None of the 6/4 No. 4 common was sufficiently affected by windbreak to fall to No. 5 common. There was no actual breakage from windbreak before or after planing in any grade or size studied.

VOLUMES DEGRADED BY WINDBREAK

No. 1 and 2 common	4.65%
No. 3 common	3.35%
No. 4 common	0.48%
All grades	1.01%

WILLIAM J. O'NEIL,
Department of Forestry, University of Missouri, Columbia.

[1] New England Timber Salvage Administration.

Points of View

Comments on Review of *Forestry in Japan 1945-1951*

It has been my intent since reading the October 1952 issue of the JOURNAL OF FORESTRY to comment on the review on *Forestry in Japan 1945-1951*. A return trip to the Far East and getting started on my assignment in the Pentagon have delayed me.

The unfavorable outlook for Japan's economy that is presented by L. L. Bishop, in reviewing Larry Cummings' report on the United States contribution to a remarkably constructive and historic program, fails to credit the progress towards economic recovery made by that splendid group of American advisors who worked so cooperatively and successfully with the Japanese. In reality, the report is a summation of the programs, prepared at the request of the Japanese, which are the basis for establishing practical measures to restore and maintain a vegetative cover on Japan's vital watersheds. It was apparent to those who worked extensively on the forestry assignment in Japan, that much could be done to restore the forest wealth of Japan's heritage by applying the principals of watershed and forest management that have been so successfully developed under similar physical conditions in other parts of the world.

Leaders of the U. S. forestry profession, who are outstanding fellows and members of the Society, through SCAP, were invited by Japanese forestry leaders to participate as a team in drafting a full plan that would encompass the problem and effect a solution. Such distinguished members of our profession as Tom Gill, Joseph Kircher, R. Clifford Hall, Charles Kraebel, George Trayer, Walt Dutton, and Arthur Spillers, to mention a few, gave their time, experience and knowledge in the preparation or endorsement of a forest rehabilitation and perpetuation program that has since been translated by the Japanese into legislation and implemented. All of this is documented in Cummings' report, which is considered of such high value by the Japanese that they had the report translated verbatim and distributed extensively.

Since Bishop in his review both avoided the constructive tone of the report and broadened his comments to include Japan's overall economic conditions, it is well to record that the situation is far from hopeless; in fact progress has been most noteworthy. The nation is financially solvent, and has a balanced national budget, which is something unusual in these days of almost universal overspending. The Japanese have instituted actions to eliminate material deficiencies; these are exampled by the implementation of projects to raise the level of national self-feeding, and to locate additional indigenous mineral resources. They parallel the constructive programs to improve the condition of forest resources.

Only recently a mission of Japanese industrial and government representatives pursuing one of the American recommendations conferred with the State Department, Forest Service and other interested U. S. agencies on the practical aspects of their timber import problem. A presentation of present conditions and the future for Japan in the economic, scientific, and natural resources fields is well summarized in the "Mission and Accomplishments" report prepared in April 1952 by the Supreme Commander for the Allied Powers. So[illegible] for Japan is feasible.

It [illegible]y observation that the Society, in promoting the interests of forestry, has been constructive and progressive and the application of this policy is reflected by the articles published in the JOURNAL. *Forestry in Japan 1945-1951* promotes this thought in its judiciously reported optimism for the successful restoration of an important forest region. Bishop's pessimistic prediction for Japan's forest economy is an attitude held by a minority who served in the earlier days of the Occupation. Cummings' summarization reports both this earlier and the improved situation of the later Occupation years that warranted the restoration of Japan's sovereignty.

I trust the JOURNAL will find it rewarding to utilize those members of the Society who are actively engaged on foreign policy assignments to appraise our international commitments and progress. Some of those working in the East at this time are Paul Bedard, the Philippines; Richard Varney, Ryukyu Islands; Donald Haibach, Japan; and Paul Zehngraff, Formosa.

HAROLD B. DONALDSON,
Colonel, Infantry,
Chief, Natural Resources Branch,
Department of the Army.

More on the Use of Aircraft in Checking Forest Photo-Interpretation

In his article *Using Aircraft in Checking Forest Photo-Interpretation* in the November, 1952 number of the JOURNAL OF FORESTRY (pages 853-5) Evert W. Johnson discusses (1) the importance of thoroughly checking aerial photo-interpretation for timber inventory and (2) the use of aircraft to make such checks in inaccessible country.

About the first point there can be no argument, there must be adequate checking to meet the accuracy requirements of the job. Generally the classification requirements of a management cruise are more detailed than the photo-interpreter can consistently furnish by photo-interpretation *per se*. Field checking to some extent is seldom avoidable.

However, after discussing the methods he used in checking by airplane the author concluded that

"such checking can be done quickly and efficiently from a low-flying airplane, particularly on large or inaccessible areas." This is a rather generalized conclusion which bears qualifying.

Undoubtedly aircraft have a certain future in checking photo interpretation. Although foresters have just begun to investigate their possibilities, indications to date are that rather than consider them a "cure all," we will have to "pick our spots." Experience in various parts of the country has shown that the extent of their use must be gauged by the intensity of the survey and/or the complexity of timber types being interpreted. That these considerations are highly important is borne out by experience during the past three years on the Superior National Forest in northern Minnesota.

This project involved the mapping for management plan purposes of some 3½ million acres. Modified infra red film with a minus blue filter was used, with photos taken at a scale of 1:15,840. This film-filter-scale combination is one of the most commonly used east of the Mississippi for new photography for forest type mapping. Mapping was done to a 2½ acre minimum with condition class areas averaging about 25 acres. Three crown closure density classes were used and four size classes. Twelve timber types were recognized.

To familiarize interpreters with local conditions intensive checking was done on all accessible areas especially along the relatively few roads on the forest. However, because of the magnitude of the intervening areas, it was thought that aircraft would provide a ready means of checking. Using airplanes similar to those described by Johnson a very thorough attempt was made to check the mapping. Flights were made at various altitudes, following various patterns, and during both summer and winter.

Subsequent ground examination and sample plots taken on the areas checked by air revealed that none of the methods tried provided a satisfactory check. It was found that as Johnson stated, height and density could be determined better from the photographs than from the air. The separation of similar appearing species or timber types from the air was frequently impossible. For instance red pine and white pine could not consistently be separated except in the large sawtimber size class. Also mixed stands which were classified on the basis of the dominant species generally were no easier to call from the plane than from the photos. Changes due to logging, planting, fire, etc., which had occurred since the time of the photos were noted more readily in many cases by consulting the records than from the plane. By and large air checking provided very few of the answers and accomplishments were far from commensurate with costs.

Since checking by airplane was not a suitable method on the Superior it would be still less fruitful for the same standard of survey in other parts of the Lake States and much of the Northeast where utilization is more intense with a consequently greater heterogeneity of species, size and density classes.

Johnson states in his article that the method was extensively used "with consistently good results *where the necessary identification could be made from the air*" Had a statement been made as to what it was considered necessary to identify, that is the mapping standards required for his surveys, the discrepancy between his results and those of the Superior might be more apparent. It is quite probable that his standards were much less detailed than those described above. This is borne out somewhat by his statement that broad species groups should be used in order to permit ready identification. If on the Superior fewer types and size classes had been recognized and the minimum size of the mapping area raised, the checking job would have been obviated to the point that aircraft could be used. However, it was not felt that this detail could be dispensed with to secure the relative cheapness of air checking. *In assaying the efficiency of aircraft checking due consideration must be given the limitations such checking places on the detail of information that can be secured.*

This consideration in many cases however will place no serious limitations on their use. Where, because of sufficiently broad survey standards and/or simple types the necessary identifications can be made from the air, the use of planes definitely should be considered as a possibility for reducing costs. In certain parts of the West, for instance, where cover conditions are not complex and utilization is relatively extensive, planes are being used quite successfully for checking. Furthermore where sufficiently accurate records are not available, as they were on the Superior, recent changes in timber types due to logging, fire, etc. may be delineated satisfactorily from the air.

A method of checking was eventually worked out on the Superior in which airplanes played an essential part. Using planes equipped with pontoons in the summer and skis in the winter, checkers were dropped on all lakes of "landable" size. Generally the checkers were flown out in the morning and picked up at prearranged locations at night. Using canoes in the summer and snowshoes in the winter it was possible to check quite accurately a considerable area each day. When planes could not be used, as in areas destitute of lakes or during the freeze-up and breakup seasons, checkers merely took out cross country or followed trails and old logging roads, thus checking large samples of typing. Corrections which were noted on the photos in the course of these expeditions subsequently were used in the office as the basis for adjusting the typing of intervening areas.

In his article Johnson discussed the possibilities of helicopters and felt they would be extremely help-

ful in checking. He goes on to point out however that their operation rates are too high to permit their general use. We are in full agreement with his observations. If and when their rates come within reach of the forester's budget, their use will be much less restricted than that of the airplane; size class, species composition, and other essential information should be much more readily determinable.

Grover A. Choate,
U. S. Forest Service,
Washington, D. C.

Further Comments

Similar problems arise in the Southwest where timber types are broader and less complex, for these broad types are broken down into small, homogenous condition classes to bring together similar density, size and stand structure classes. However, aircraft have been used successfully in differentiating between Douglas fir and ponderosa pine stands. There is very little difference in the photo images of these two important species at scales ordinarily used for forestry purposes, even on the best photography. The conical crown of the fir, as contrasted with the typically rounded top of ponderosa pine, is sometimes used as a diagnostic feature, but immature pines also have a conical crown and old firs frequently have a rounded crown, so the generalization will not hold. Another generalization that the firs occupy the cool, moist sites has many exceptions in higher elevations where most sites become cool and moist. It was found that the only sure method was to do the best job of type mapping possible on the photos, and then after plotting the type lines on a map, to check them from the air. The slightly darker color and finer texture of the fir tops makes the difference quite apparent to the naked eye. The photo interpretation can then be quickly corrected. Eventually better film and filter combinations may bring out this species difference photographically.

This method was also useful in checking the lines between cutover and virgin timber in the West where cutting was done after photography. It has been found thru long experience that sketch maps made on the ground to record the progress of cutting are frequently unreliable. They seldom coincide with details on aerial photos, even when maps produced from aerial photos are used as a base. From the air these cutting lines can be distinguished after very careful observation and the lines may be mapped by tying them to the topography. Even the lines between old and fresh cuttings can be identified by the differences in the color of the stumps and slash. It is felt that such a method should be more widely used in preparing area estimates before a management plan revision. It is faulty reasoning to make careful volume estimates of cut and uncut stands and then to undermine the estimates with area estimates which have little for a factual basis. The trend toward smaller sampling and less ground cruising emphasizes the need for greater accuracy in area measurements.

Gordon R. Heath,
U. S. Forest Service,
Washington, D. C.

Men are never so likely to settle a question rightly as when they discuss it freely.

Thomas Barington Macaulay

Reviews

Logging Mechanization in the U.S.S.R.

By A. Koroleff. 158 pp. Illus. McGill University Book Store, Montreal, Canada. 1952. $5.

Similarity in forest conditions of the U.S.S.R. and many parts of Canada give rise to many common problems in the field of logging. In the past, the Russians have borrowed heavily from North American experience for mechanizing their logging operations. In recent years, however, they have shown much boldness and ingenuity in their search for means to increase the efficiency of harvesting their large forest resources. While the Soviet Union has been very secretive about most information of an economic nature, a voluminous Russian literature concerning recent developments of logging techniques has been accessible to the Free World. Based on about one hundred technical articles and editorials, which appeared between 1947 and 1952 in the Russian logging periodical *Forest Industry* (*Lesnaya Promyshlennost*), Koroleff presents a picture of the basic principles guiding the directions of mechanization of logging, and illustrates this trend by giving detailed descriptions of methods and equipment typical of the latest logging developments in the U.S.S.R.

The reader should be cautioned not to accept the methods described as commonly established practices. The purpose of *Forest Industry*, the technical organ of the Soviet Ministry of Timber Industry, is not to describe conditions as they are, but rather give publicity to new developments which have progressed sufficiently to receive the O.K. from the bosses in Moscow and are intended for wide application. Koroleff believes that, even if data reviewed are discounted considerably, the Russians have overcome most of the early difficulties, and that the rate of increase in logging efficiency is much greater in the U.S.S.R. than in Canada, because of energetic efforts in logging mechanization and strong support of research.

Following the custom of the publications (of which this is one) of the Pulp and Paper Research Institute of Canada, an excellent summary precedes the main text. The latter contains the following chapters: timber resources, development of logging mechanizations, logging machinery, labor and management, techniques of mechanical logging, and logging mechanization and forestry. Full translations of articles of special interest are given in a 63-page appendix. Among the titles are electric skidding tractors, gas producers for skidding tractors and portable electric power stations operating on green fuelwood, electric power stations for logging machinery, skidding and truck haul of trees with crowns, freezing of winter stream flow to store it for river drive.

These selected topics indicate the great importance the Russians give electricity and wood as the power source for mechanization of woods operations. Relative scarcity of liquid fuel resources, remoteness of principal oil fields from northern forest regions, and national security prompted the Soviet government to take this decision, the guiding principle being that the forest itself should provide the power for logging through utilization of inferior wood and logging waste. Having made that decision, the Soviets put their researchers to work to develop gas producers which work with dry or green wood. Recently the trend has been more and more to use electricity produced from wood by portable power stations.

Koroleff reproduced schematic sketches of variations of eight standard setups, four each for skidder and tractor logging, showing the cutting sequence in the wood, the position of the various pieces of equipment, the layout of electric cables to operate the saws on the cutting area, and for lighting the landing for night work. These sketches reveal the utmost degree to which mechanization is to be pushed at least on larger operations. The technical detail presented should give much cause for pause and thought. Hand in hand with mechanization, attention is given to streamlining of the jobs, deseasonalization of the operations, and to better utilization.

In our present position as leaders in the fight against world domination by Communism, lack of knowledge of the physical accomplishments of the Soviet regime is dangerous. The author deserves our thanks for his great labor in translating and organizing this large collection of data, permitting us a peek through an only partly veiled window in the iron curtain. The value of the book far transcends the profit it might impart to the logger of the north woods in the form of practical hints.

RUDOLPH STAHELIN.

The Timber Supply Situation in Florida.

Forest Resource Report No. 6, U. S. Department of Agriculture. 60 Pages. Illus. 1952. Government Printing Office, Washington 25, D. C. 70 cents.

In 1936 the drain on all sizes of timber in Florida exceeded growth by 68 percent, while in sawtimber alone the drain was twice the growth. Thirteen years later, growth exceeded drain both in sawtimber and in other classes.

This striking reversal of trend in such a short time is brought out by this report written by Robert W. Larson of the Southeastern Forest Experiment Station, Asheville, N. C. It is based on extensive aerial surveys and ground studies brought down to 1949.

But the picture is not quite so

bright as these statements might imply. There has been a decrease in pine areas, a large increase in scrub oak and other poor quality hardwoods. There is too much poorly stocked land, and too many stands of worked-out turpentine trees. Overall, the estimate is that the total annual increment for the state averages only 65 board feet per acre or three-tenths of a cord, whereas the rate could be easily doubled by the application of simple, well-known measures.

The report contains 60 large pages, the data are excellently presented in charts, tables, and photographs, and a large forest type map in colors is most instructive. The accompanying discussion of conditions, tendencies and possibilities is factual, lucid, and helpful.

Royal S. Kellogg.

Trees, Shrubs, and Flowers to Know in British Columbia.

By C. P. Lyons. 168 pp. Illus. J. M. Dent & Sons Ltd., Vancouver, B.C. 1952. $3.25.

Deservedly, this compact handbook should enjoy considerable popularity among those who wish to know the common plants of British Columbia as well as those who have a more professional interest in this field. The subject matter is arranged to satisfy the needs of the layman, but those who are interested in the more technical aspects of this subject will also find it highly useful.

In addition to detailed description of the individual trees, shrubs, and flowers described, the author also includes considerable background information. This adds to the value of the book by indicating the relationship of various species to each other and to their environment, a factor that is of particular importance in an area as extensive and as widely diversified in climate and topography as is British Columbia. Included in this category is an outline of the life zones of the Province of British Columbia, a chart illustrating the altitudinal ranges of various plants in specific regions, a calendar indicative of the approximate time when flowers and fruits of numerous plants may be found, and a pictorial key to both coniferous and broadleaved trees. A list of a number of edible plants and short descriptions of eight common ferns are also included.

As one might expect, proper and abundant illustrations are vital in a book of this type. Consequently, it should be noted that the very excellent sketches — also prepared by the author—are of equal importance to the interesting arrangement of the material, and the concise, clear descriptions of the various species included.

In general this book is indicative of the author's broad interest in this field, his technical training, the character of his field experience, and his understanding of methods by which an understanding of the educational and recreational values in the field of natural history can be developed in the average person. As the first guide of this type for British Columbia it should aid materially in a better understanding of the flora of that area.

C. Frank Brockman.

Forest Planting Possibilities on Indiana Coal Stripped Lands.

By Glenn H. Deitschman and Richard D. Lane. 57 pp. Illus. Technical Paper No. 131. Central States Forest Expt. Sta. Forest Service, U. S. D. A., Columbus, Ohio.

As background for discussing the forest planting possibilities of coal stripped lands the authors have set forth certain introductory material about the strip coal program. It includes, but is not limited to, early historical references, changes in land use and topography by mining, economic factors, early interests in forestry and recreational uses by the coal companies, coal land legislation and certain experiences of land holding and development. The publication is well illustrated.

Pertinent statistical material is portrayed with numerous tables and graphs. A comprehensive bibliography of coal land literature preceeds an appendix which includes four tables presenting a very complete summary of the area mined by county, acidity class, soil texture, character of vegetation and coal seam, and the progress made in converting the area to productive uses.

This interesting technical paper is the best comprehensive analysis thus far of the potential forestry possibilities on the lands disturbed in the strip mining of coal. Pertinent literature covering the work done by others is covered adequately with a brief review of the coal geology and the various uses being made of the land mined in this manner.

The extent and character of the coal stripped lands and the effects which glaciation had on the materials are well covered. The composition of the overlying strata over the major seams of coal is discussed in detail, particularly as to its acidity and sulphur content, two factors which materially influence the future use of all mined areas.

Older forest plantings, dating back to as early as 1927, together with natural forest reproduction on some areas, form the basis for comprehensive tables showing the stocking and merchantable volume of both the planted and volunteer stands. The effects of acidity, topography, texture of the material, and erosion are all taken into account in evaluating the factors affecting plantation success. Necessary management practices to insure perpetuation of the stands are covered briefly.

Three series of experimental plantings form the basis for more detailed work on species adaptation to different spoil conditions and to the effect of black locust on other hardwoods planted at the same time and on hardwoods used to underplant old locust stands.

The summary emphasizes the fact that two of the most important geologic influences which influence the quality of Indiana strip coal

lands for forest growth are the occurrence of glacial deposits and of highly sulphurous strata above the coal. Planted stands are found to show sharp contrast in stocking and quality to naturally forested stands, with pine plantation types more successful than others. More recent plantings of hardwoods indicate a great deal of possibility for some species. Older plantings 18 to 20 years old indicate some advisibility of thinning and pruning.

It also contains preliminary planting guides covering the disturbed areas in the three glacial regions where mining is being carried on. These tentative recommendations, derived from evidence obtained in the older plantings, from the three series of experimental plots established by the Station and from similar experimental plantations in Illinois and Ohio are in our opinion the best recommendations to be followed until such time as additional information may prove otherwise.

The research job is well done. The information contained in the paper is extremely important to those interested in forest planting possibilities of strip mined lands.

RALPH F. WILCOX
L. E. SAWYER

❦❦❦

Son of the Forest

By Arthur Carhart. 244 pp. J. B. Lippincott Company, Philadelphia and New York. 1952. $2.50.

Son of the Forest is a story about people and grazing problems on a troublesome ranger district in a western national forest. Told in the best Lone Ranger Hi O Silver manner, there is almost as much wallop in the plot for adults as for late teenage readers, at whom the author was aiming.

Characters include an intensely loyal though somewhat pedantic and stubborn forest ranger, his seventeen-year old son, a teenage Greek sheepherder, two teenage cowgirls, a teenage cowboy troublemaker, a senator, and a couple of "rugged individual" stockmen permittees.

A one time member of the Forest Service who has maintained a keen interest in that organization, the author imparts plenty of authenticity and mixes numerous conservation messages with his fist fights, cougar killing, fire fighting, floods, and chicanery. Despite some tantalizing, very likely moments, sex interest is on a healthy platonic level expertly maintained from start to finish.

Home tests by the reviewer demonstrated that *Son of the Forest* adequately satisfied the comic book-conditioned literary tastes of two teenagers and taught important conservation lessons during digestion. High school instructors teaching conservation or related subjects will rightly add it to bibliographies of recommended reading.

J. N. HESSEL,
U. S. Forest Service.

❦❦❦

British Commonwealth Forest Terminology—Part I.

163 pp. The Empire Forestry Association, Northumberland Avenue, London, W.C. 2. 1952. 21s.

Part I of this terminology includes "Silviculture, Protection, Mensuratian and Management, together with allied subjects."

Americans may note with considerable pride the first statement in the introduction of the book. It is quoted from a review written by professor Champion in the *Empire Forestry Journal* at the time of publication of our own *Forestry Terminology*. Professor Champion called upon the British foresters to study their own vocabulary and publish a similar terminology so that the American and the Britisher would know what each other meant when talking or writing "shop." He concluded by saying that "it may be hoped that an outcome of the two publications will be a joint effort to reduce the number of terms which are used in different senses in different parts of the world, and that a more widespread knowledge of terms already in use will reduce the likelihood that such differences will arise in future."

The *British Commonwealth Forest Terminology* is a big second step in attaining the goal of preciseness of expression between professional foresters regardless of citizenship.

The terminology is arranged in one single alphabetical list as is ours with the exception of two major subjects, "Silvicultural Systems" and "Tree Classes and Thinning Grades," which are defined in an appendix. These two subjects in the appendix appear in outline form which gives the relationships of sub-headings of the subjects at a glance. This procedure was almost necessary for presenting "Tree Classes and Thinning Grades," where parallel definitions for Indian and U. K. usage are given. It works well also with "Silvicultural Systems." Seeking a definition of "Shelterwood coppice system," the reader finds the term in its proper alphabetical place in the book with instructions to see "Silvicultural systems, Appendix I." Referring to the appendix, he finds a definition of "Shelterwood coppice," and from its position in the outline of silvicultural systems he can readily catch its relationship to the other silvicultural systems defined.

A large number of definitions were adopted in entirety from our own *Forest Terminology*, where possible to do so, or adapted to conform with Empire forestry usage. However, a number of additional terms are used, especially in silviculture and management, and those previously accepted and recommended for use in glosseries of Australian and Indian usage were incorporated into the book.

This terminology was compiled by the Terminology Committee of the Empire Forestry Association under the chairmanship of Professor Champion, much after the procedure used in this country. Like ours, it is limited to "(1) Terms used in a special sense by foresters and (2) terms from other sciences and industries, the meaning of which a forester should know and

which may not be defined in other glossaries or texts likely to be readily available to the average forester." It, however, includes a larger number of definitions of terms from other sciences and industries likely to be used by the practicing foresters than does the American terminology.

Part II of the terminology, now in progress, will bear the subtitle, "Extraction, Utilization and Trade in Forest Products" while a planned Part III will deal with terms used in research.

Our professional counterparts in the British Empire may not be the "firstest" but it looks as though they are going to have the "mostest."

Arthur B. Meyer

382 Photomicrographs of 91 Papermaking Fibers.

By Charles H. Carpenter and Lawrence Leney. 150 pp. Illus. State University of New York, College of Forestry, Syracuse. 1952. $2.00.

Anyone interested in the cellular structure of various woods can hardly get along without this revision and enlargement of a similar book by the senior author and now out of print. The new work covers 70 woods, 16 herbaceous plants, and 15 of wool, silk, asbestos, rayon, and nylon. The herbaceous plants include corn, sugar cane, bamboo, wheat, rice, esparto, jute, hemp sisal, cotton, flax, and kapok. All fibers depicted are described as of interest and value to the papermaker. But laboratory criminologists will find them no less interesting.

Each pair of pages features a single wood or other fiber (except in a few cases). On the righthand pages are the plates; on the lefthand pages are the descriptions. For example, in the case of yellow birch, the plate carries a 180x vessel segment, a 90x vessel segment of different type, a 90x narrow vessel segment, and a 90x fiber. Each cell is complete from end to end.

In grand total there are 382 photomicrographs, whereas the older book of 1932 contained only 229. All photomicrographs are reproduced by collotype, a screenless process. The illustrations are quite clear, distinct and, in the reviewer's opinion, superior to those printed by the halftone process in the earlier book.

The book has a very convenient format. It is spirally bound and lies flat when open; rather than presenting plate descriptions in text form they are very brief and refer only to distinctive features; the plate descriptions occupy part of the page opposite the plate.

Such identifying features as pits, crosswalls, fiber ends, and vessel segment end markings are particularly good. The maceration, fiber preparation, and photomicrography are very skillfully done.

The price, $2.00, probably does not cover full cost of printing, binding, and marketing.

Emanuel Fritz,
University of California.

Publications of Interest

A booklet entitled "Forest Resources of the Pacific Northwest and Their Use" has been published by the Industrial Forestry Association, 1410 S.W. Morrison St., Portland 5, Oregon. This 11 page booklet was adapted from an address made by W. D. Hagenstein, past associate editor of the Journal, before a conference of Oregon teachers. An excellent, brief summary of the timber resources and their use in that region is given. Copies may be secured by writing the Industrial Forestry Association at the above address.

★ ★ ★

The Forest Products Research Society has just released its 1952 Annual Proceedings. The 344-page publication is titled "The Annual Proceedings of the Journal of the FPRS, Vol. 2, No. 5."

It features the complete text of 48 papers presented at the nine technical sessions at the FPRS sixth annual meeting held at Milwaukee, Wis., June 23-25, 1952, and the full discussion from the floor which followed.

Copies are available from the society's executive office at Box 2010 University Station, Madison 5, Wis. Price, $7.00 paper-bound, $9.00 cloth-bound.

★ ★ ★

Inspired by the disastrous fire losses in Tennessee during the fall season of 1952 the *Joint Report on Forest Fire Control in Tennessee* summarizes recommendations for meeting such situations in the future. The report was prepared for and approved by the Tennessee Citizens Committee for Forest Protection and is distributed by the Keep Tennessee Green Association, 3315 Windsor Court, Chattanooga, Tenn. Its recommendations should be of interest to Southern and Midwestern fire control planners.

Current Literature

Compiled by MARTHA MEELIG, *Librarian, The New York State College of Forestry*

Range Management Section Compiled by FRANCES FLICK, *Library, U. S. Department of Agriculture*

General

Forests for Israel. 16 pp. Illus. Jewish National Fund, Jerusalem. 1952.

Four-H Club Forestry Manual. 48 pp. Univ. of Illinois College of Agric., Extension Serv., Urbana. B-422. Mimeog.

A Manual of Forestry. 247 pp. Illus. Texas Forest Serv., College Station, 1952. Bul. No. 15. $2.00.

When Pine Was King. By L. C. Reiman. Illus. Publ. by the author, 2504 Brockman Blvd., Ann Arbor, Mich. 1933. $3.75.

A Woodman's Diary. By J. D. U. Ward. 352 pp. Illus. Routledge & Kegan Paul, Ltd., London. 1952. 21s.

Farm Forestry

Care of Forest Plantations on Farm Lands. By F. E. Winch, Jr. 24 pp. Illus. State Univ. of New York. College of Agric. ,Ithaca. 1952. Cornell Ext. Bul. No. 867.

Pulpwood from Small Woodlands. 77 pp. Illus. Northeastern Wood Util. Council, New Haven 6, Conn. 1953. Bul. No. 40. $2.00.

Pulpwood Procurement with Woodlot Conservation. By M. R. Wilson. 6 pp. Illus. Canadian Pulp & Paper Association, 2280 Sun Life Bldg., Montreal 2. 1952. Woodlands Sect. Index No. 1239.

Thin Your Pine Plantations for Fence Posts. By A. K. Thurmond. 31 pp. Illus. TVA, Norris, Tenn. 1952.

Forest Influences

A Method of Determining Surface Runoff by "Routing" Infiltrated Water Through the Soil Profiles. By D. E. Whelan, L. E. Miller and J. B. Cavallero. 15 pp. Northeastern Forest Expt. Sta., Upper Darby, Pa. 1952. Station Paper No. 54. Processed.

Some Plant-Soil-Water Relations in Watershed Management. By Leon Lassen, H. W. Lull and Bernard Frank. 64 pp. U. S. Dept. of Agric., Washington 25, D. C. 1952. Cir. No. 910. 20 cents (Govt. Print. Off.)

Forest Management

The Dot-Reading Overlay for the Measurement of Map Areas. By J. M. Robinson. 2 pp. Canada Dept. of Resources & Development. Forestry Branch, Ottawa. Forest Inventories (Forest Air Survey) Publ. No. 8. Processed.

Growth of Yellow-Poplar and Associated Species in West Virginia . . . as a Guide to Selective Cutting. By C. J. Holcomb and C. A. Bickford. 28 pp. Northeastern Forest Expt. Sta., Upper Darby, Pa. 1952. Station Paper No. 52. Processed.

Planning and Control in the Managed Forest. By Hermann Knuchel. Trans. by M. L. Anderson. 376 pp. Illus. James Thin, 54-59 South Bridge, Edinburgh, Scotland. Spring ,1953. About 35s.

Forest Resources

Forest Resources of Montana. By S. B. Hutchison and P. D. Kemp. 76 pp. Illus. U. S. Forest Serv., Washington 25, D. C. 1952. U. S. Dept. of Agric. Forest Res. Rept. No. 5. 55 cents (Govt. Print. Off.)

Forest Statistics of Central and Northern Indiana. 29 pp. Central States Forest Expt. Sta., Columbus 15, Ohio. 1952. Forest Surv. Release No. 14. Processed.

Forest Statistics of Indiana. 36 pp. Central States Forest Expt. Sta., Columbus 15, Ohio. 1953. Forest Surv. Release No. 15. Processed.

Resource Factors Affecting the Feasibility of Pulp Mills in Eastern Montana. By S. B. Hutchison and J. H. Wikstrom. 35 pp. Northern Rocky Mountain Forest & Range Expt. Sta., Missoula. 1952. Station Paper No. 34. Processed.

The Timber Supply Situation in Florida. By R. W. Larson. 60 pp. U. S. Forest Serv., Washington 25, D. C. 1952. U. S. Dept. of Agric. Forest Res. Rept. No. 6. 70 cents (Govt. Print. Off.)

Logging and Milling

Kiln Operator's Handbook. By W. C. Stevens and G. H. Pratt. 138 pp. Illus. Great Britain Dept. of Scient. & Indus. Research, London. 1952. 10s. 6d. (H.M. Sta. Off.)

Lumber From Forest To You! 24 pp. National Lumber Manufacturers Association, 1319 18th St., N. W., Washington 6, D. C. Processed.

Die Praxis des Neutzeitlichen Holztransportes. By Franz Hafner. 295 pp. Illus. Georg Fromme & Co., Vienna. 1952. $6.25 (U. S.)

Protection

Chrysopa Canea St. and Its Enemies in Israel. By S. Neumark. 127 pp. Illus. Conservator of Forests, Nathanya P. O. Box 88, Israel. 1952. Forest Res. Sta. Hanoth No. 1.

Forest Fire Fighting Fundamentals for Use by Fire Protection Agencies and Cooperators Engaged in Fire Fighting on Forest and Other Wild Land. 57 pp. Illus. U. S. Forest Serv. and California Div. of Forestry, San Francisco. 1952.

Forest Fires and Forest Fire Control in Wisconsin; A Historical Record of Forest Protection Activities in Wisconsin. By J. A. Mitchell and Neil LeMay. 75 pp. Illus. Wisconsin State Conserv. Comm., Madison in cooperation with U. S. Forest Serv. 1952.

Silviculture

Early Growth of Managed Upland Hardwood Forests in Southern Illinois. By L. S. Minckler. 2 pp. Central States Forest Expt. Sta., Columbus 15, Ohio. 1952. Station Notes No. 72. Mimeog.

Forest Planting Possibilities on Indiana Coal-Stripped Lands. By G. H. Deitschman and R. D. Lane. 57 pp. Illus. Central States Forest Expt. Sta., Columbus 15, Ohio. 1952. Tech. Paper No. 131. Processed.

The Periodicity of Wood Formation. By Kjeld Ladefoged. 98 pp. Kongelige Danske Videnskabernes Selskab, Copenhagen. 1952. Dan. Biol. Skr. 7, No. 3. 20 Kr. (In English)

Reproduction on Cut-Over Swamplands in the Upper Peninsula of Michigan. By Z. A. Zasada. 15 pp. Lake States Forest Expt. Sta., St. Paul 1, Minn. 1952. Station Paper No. 27. Mimeog.

Suggested Projects in the Genetic Improvement of Southern Forest Trees. By Committee on Southern Tree Improvement. 12 pp. Southeastern Forest Expt. Sta., Asheville, N. C. 1952. Station Paper No. 20. Processed.

Range Management

Apparent Kill of Persimmon and Sassafras by Application of 2,4-D and 2,4,5-T. By C. S. Martin. 8 pp. Illus. U. S. Forest Serv., Central States Forest Expt. Sta., Columbus, Ohio. Tech. Paper No. 132. December 1952.

Economic Development of the Western Range Resources; An Inventory of Research. By O. Cummings. 60 pp. Montana State Col., Bozeman. 1952.

Microclimate as an Environmental Factor in Grasslands. By F. M. Churchill. 5 pp. Wyoming Range Mangt., Laramie. No. 53. November/December 1952. Mimeog.

Pasture and Fodder Development in Mediterrancan Countries. By the Organization for European Economic Cooperation. 176 pp. Columbia Univ. Press, New York, N. Y. (Paris, 1951). $3.00.

Range Investigations, Bighorn National Forest, Wyoming. (Progress Rpt. 1). By R. M. Hurd and N. A. Kissinger. 34 pp. U. S. Forest Serv., Rocky Mtn. Forest & Range Expt. Sta., Ft. Collins, Colo. Sta. Paper No. 10. November 1952.

Wood Technology and Utilization

Portable Band Mill Integrated with Logging Points Way to Greater Utilization. By T. E. Collins and D. P. Thomas. 14 pp. Illus. Inst. of Forest Products ,Seattle 5, Wash. 1953. Bul. No. 3.

Report of Second Conference on Mechanical Wood Technology 6-18 August 1951, Igls, Austria. (First was in Geneva, Swit. 1949) 71 pp. FAO. Mimeog.

Society Affairs

Officers and Members of the Council, 1952-1953

GEORGE L. DRAKE, *President*
Simpson Logging Company
Shelton, Wash.

WILLIAM J. BROWN
Woodlands Department
Kimberly-Clark Corporation
Neenah, Wis.

D. B. DEMERITT
Dead River Company
6 State Street
Bangor, Me.

FRANK H. KAUFERT
School of Forestry
University of Minnesota
St. Paul 1, Minn.

ELWOOD L. DEMMON, *Vice President*
Southeastern Forest Experiment Station, Federal Building
Asheville, N. C.

C. OTTO LINDH
U. S. Forest Service
P. O. Box 1310
Albuquerque, N. M.

GORDON D. MARCKWORTH
College of Forestry
University of Washington
Seattle 5, Wash.

RICHARD E. MCARDLE
Forest Service
U. S. Department of Agriculture
Washington 25, D. C.

HENRY CLEPPER, *Executive Secretary*
Mills Building, 17th Street at Pennsylvania Avenue, N. W.
Washington 6, D. C.

EARL PORTER
Southern Kraft Division
International Paper Company
Mobile 9, Ala.

PERRY A. THOMPSON
12 Elkin Court
San Rafael, Calif.

RUTHFORD H. WESTVELD
Department of Forestry
University of Missouri
Columbia, Mo.

The President's Column

Last month I discussed some of the problems in keeping the members better informed about Society activities. This month I want to tell you about certain aspects of the Society's operations. Some of these things you know; perhaps others you don't.

The Council is the Society's governing body. Its 11 members are elected for two-year terms. The president, vice president, and the executive secretary are the officers of the Society.

Under the Constitution, the Council establishes the general policy by which the Society operates, and appoints the executive secretary and the editor. The editing and printing of the JOURNAL and other publications is handled in the executive office, as are also all other business operations.

Although the executive staff serves as the center for all professional activities, this staff could do very little without the participation in all phases of Society affairs by the 21 Sections and their Chapters, the 11 Divisions, 18 Committees, and the Editorial Board of the JOURNAL. These groups form the spokes of a wheel of which the executive office is the hub, and both are needed to keep the wheel turning.

Parts of the Whole

Society activities can be divided into five parts:

1. The JOURNAL and other publications, two of which are in process of completion now—*The Foresters' Manual* and the forest type bulletin.

2. Membership services. These include all administrative services in the business operations of the Society. They include the keeping of membership records, membership applications and admissions, holding elections and referenda, arrangements for national meetings, and other services necessary to the efficient functioning of the organization.

3. Services to the Council, Sections, Chapters, Divisions, and Committees. These include the collection of Section dues, the maintenance of the Section Manual for Section officers, maintenance of rosters of Section and Division officers, and assistance rendered the Divisions in conducting their meetings.

4. Technical assistance and services to individual members. These include providing information on request about technical matters, employment assistance, maintaining the professional records of members, and helping members having professional problems whenever the Society can be of assistance. The number of requests from members for individual services of this sort is increasing every year.

5. Professional and public relations. These comprise many activities carried on by the Society to keep other professional, scientific, and business organizations informed about the profession of forestry. A large part of the executive secretary's time is spent in necessary cooperative activities with educational, technical, and conservation associations. The editor supplies articles and information on request to other publications.

The foregoing list of five fields of services might be broadened to include numerous activities which I shall not take space to mention. A page could easily be written to de-

Julian E. Rothery (1885-1953)

Julian Eastman Rothery died at his home in Cotuit, Cape Cod, Mass., on Feb. 5, 1953. Mr. Rothery, after graduating from the Scientific School of Yale University, where he took the course preparatory to forestry, entered the Yale Forest School, and in 1908 received his M.F. degree. In July, 1908, he entered the Forest Service as a Forest Assistant. In 1910 he was placed in charge of the Idaho Forest, with headquarters at McCall, Idaho.

During 1912, Mr. Rothery left government employment to become a consulting forest engineer. From 1927 to 1935 he served as chief forester of the International Paper Company and reentered the Forest Service in the latter year, where he remained until retirement in 1947.

Mr. Rothery was a fellow of the American Association for the Advancement of Science, a member of the Canadian Society of Forest Engineers and a Member, since 1911, of the Society of American Foresters.

scribe each one in detail. Many important functions that are indispensable to the running of the Society, or any other business, are largely routine, such as bookkeeping and membership records.

Budget

The budget for the fiscal year 1953 was published in the January issue of the JOURNAL, page 50. It also showed income and expense for 1951 and 1952. During those years the Society operated in the black.

For 1953 expense is estimated to be approximately $112,800 and income about $113,000. Income and expense are so nearly in balance that it is impossible to build up much of a reserve fund, which ordinarily is a desirable thing to do in order to have reserves for possible contingencies or special projects.

In a future report I intend to discuss the Society's financial condition in more detail. For the present I want to give two breakdowns to show approximately where each dollar of income is derived and where it is spent.

The approximate source of each dollar of income is as follows:

	Cents
Journal of Forestry	55
Members' dues	41
Interest	1
All other	3
Total	100

The average member's dollar is spent as follows:

	Cents
Journal of Forestry	36
Membership services	32
Services to Council, Sections, Chapters, Divisions, and Committees	19
Technical services	9
Professional and public relations	4
Total	100

The Council will probably hold its next meeting in May. We would be interested to hear from members who may wish to comment on any phase of operation of the Society.

As I myself see it, the Society's situation is this: in order to advance the profession of forestry, the Society must maintain an efficient headquarters staff, adequately financed, adequately housed, and with adequate personnel. At present we are operating at a minimum in all three of these things.

Additional activities, which the Council and many members believe we should be carrying on in the interests of the profession, will take more money, perhaps as much as 25 percent more. Later I want to discuss some of these additional activities, explain why and how they are desirable, and present my estimate of what they will cost.

In 1950 the Society celebrated its golden anniversary. It is a good Society, gaining steadily in influence, in prestige, and in service to the members and the profession. The present half-century of second-growth can be even better if we have the same vision, courage, and aggressiveness of those who founded the S.A.F.

What do you think?

Geo. L. Drake

Rockefeller Foundation Makes Grant to Society of American Foresters for Study of Forestry Research

The Rockefeller Foundation, New York, N. Y., has made a grant of $30,000 to the Society of American Foresters for a study of forestry research, to be conducted during 1953-1954 in cooperation with the National Research Council.

This study was first proposed at a meeting of the National Research Council's Division of Biology and Agriculture on May 15, 1951. The proposal was presented by E. L. Demmon, representative of the Society of American Foresters to the N.R.C.'s Division of Biology and Agriculture, and Henry Clepper, S.A.F. executive secretary. At a meeting of the S.A.F. Council in June 1951, the proposed study was unanimously approved. (JOURNAL OF FORESTRY, August 1951, pages 596-597.)

Reasons for the Study

A significant stimulus to the development of forestry research occurred during the late 1920's when the Rockefeller Foundation, through the General Education Board, made possible the first full-scale, nongovernmental study of the subject. It resulted in the publication of Bailey and Spoehr's valuable book *The Role of Research in the Development of Forestry in North America*. This study was financed by the General Education Board on the recommendation of the National Academy of Science.

During the course of the study, and doubtless influenced by it, the McSweeney-McNary Forest Research Act of 1928 was passed by the Congress. This law charted the course which federal research activities in forestry have followed ever since.

In 1953 the McSweeney-McNary Forest Research Act of 1928 will have been in operation 25 years. During this period the amount and scope of research in forestry have grown enormously. Estimates by the U. S. Forest Service indicate that in excess of $17,000,000 annually is being spent by federal, state, educational, and industrial agencies for all kinds of forest and wood-use research. A substantial part of this program is being carried by federal agencies under authority of the McSweeney-McNary Act, including considerable cooperative work with the states and the land grant colleges and their agricultural experiment stations.

The year 1953, the 25th anniversary of the McSweeney-McNary Act of 1928, presents a suitable occasion for a re-examination of the whole structure of forestry research programs. Specifically, a reappraisal would be valuable in order to determine:

1. Whether the progress in research has been satisfactory and adequate in the light of the nation's economic and social dependence on the forest resource and its products.

2. The status of current forestry research projects—governmental, institutional, agricultural, industrial—and the identification of areas of strength and weakness.

3. What the future goals should be during the next twenty-five years, based on the best available estimates of probable needs for timber, forage, wildlife, water, and soil conservation.

During recent years there have been several studies made of the adequacy of various programs having to do with American forest policy, the management of public and private timberlands, and studies of such related resources as water, range, and wildlife. But there has been no study made of the adequacy of existing research efforts in forestry.

Role of the Foundation

In presenting this proposed project to the Rockefeller Foundation, the So-

ciety emphasized its possibilities as a guide to the future development of forestry in America. It will be remembered that the General Education Board (a subsidiary of the Rockefeller Foundation) made a significant contribution to forestry research when it financed the original study of 1928.

The Rockefeller Foundation is primarily a grant-making organization. Except to a limited extent, in public health and agriculture, the foundation does not itself engage in research and experimentation, or furnish services in particular fields; rather it seeks to advance its charter purpose "to promote the well-being of mankind through the world" chiefly through grants to universities, research institutes, and other qualified agencies conducting work within the scope of the foundation's program.

While the foundation's action in making a grant carries implicit approval of the proposal for which the grant is made, the recipient, and not the foundation, is responsible for giving effect to the proposal and for its results. Hence, the Society will share control over the project with the National Research Council, and responsibility for its results.

Organization of Project

The Society has invited the cooperation of the National Research Council in naming a five-man steering committee to give supervision to the project under the chairmanship of E. L. Demmon, vice president of the Society. This committee will designate a salaried project leader with responsibility for the execution of the project, and part-time collaborators of such number and for such special fields as may be necessary.

On completion of the study in 1954, the Society will publish a report on the findings.

Further announcements about the project will appear in the JOURNAL.

Allegheny Section Meeting

The annual winter meeting of the Allegheny Section was held in the Sylvania Hotel, Philadelphia, February 26-28. The registered attendance was 180. Chairman D. E. Hess presided.

Among the papers presented was a report on the Timber Resource Review by Roy W. Olson of the U. S. Forest Service, Region 7. It was discussed by Carl Johnson, director of the Department of Conservation of West Virginia, and by John Tillinghast, consulting forester of Clothier, W. Va.

A paper on "Chemical Debarking and the Management of Woodlands" was presented by A. L. Bennett of the Armstrong Forest Company.

Dr. William Webb of the College of Forestry at Syracuse University read a paper on "Chemical Debarking and Wildlife Management."

Dale Arner of the Maryland Game and Inland Fish Commission discussed "Wildlife Management and Forestry."

A report on the current status of oak wilt was given by Dr. Marvin E. Fowler of the U. S. Department of Agriculture.

A panel discussion on "How to Obtain Better Forest Practices on Small Woodlands" was held with E. B. Moore of the New Jersey Department of Conservation and Development as moderator. The panel consisted of James Elliott of Coudersport, Pa.; Gerald H. Williams and James Simmons of Bel Air, Md.; and Amzie B. Hoffman of Gladstone, N. J.

A final paper on new woodland harvesting equipment was presented by David Sowers of the West Virginia Pulp and Paper Company.

Henry Clepper, executive secretary, and Arthur B. Meyer, editor, discussed Society affairs.

New officers were elected as follows:

Chairman, Adna R. Bond, Arnold, Md.

Vice chairman, Austin N. Lentz, College of Agriculture, Rutgers University, New Brunswick, N. J.

Secretary-treasurer, Harvey R. Frantz, INCODEL, Dodson Bldg., 528 N. New Street, Bethlehem, Pa.

Mr. Lentz will serve as chairman of the Section's Membership Committee.

New York Section Winter Meeting

"Forest Research in New York," the general theme of the winter meeting of the New York Section, attracted a capacity attendance of 150 members and guests on January 29th and 30th at the Hotel Syracuse. Forestry educators and practitioners have recognized the urgent need for greater exploitation in the field of forest research and, as a result of the efforts of Program Chairman Raymond W. Benson and his committee a commendable group of speakers presented outstanding talks relative to forest research.

Chairman Fred E. Winch called the meeting to order and after welcoming remarks turned the chair over to Raymond W. Benson who presided for the morning session. Dean Hardy L. Shirley of the College of Forestry presented the lead-off paper entitled "The Role of Research in Forestry." Following this, two papers "Research Problems in the White Pine Region of New York" and "Research Problems in the Central Adirondacks" were presented by Prof. Svend Heiberg and John R. Curry respectively. Comments were presented relative to forest research in the important forest regions of New York.

The afternoon session, presided over by John W. Barrett, was devoted to research concerning utilization of forest products. Dr. Edwin C. Jahn presented two papers entitled "Utilization Research" and "Utilization of Hardwoods in Wood Pulp." Further emphasis was placed on utilization research in the use of wood in a paper dealing with the "Development and Use of Modified Woods" by C. B. Lundstrom, President of Lundstrom Laboratories, Little Falls, N. Y. The basic physical properties of wood were discussed by Donald Moreland of the College of Forestry in an illustrative talk "Application of Radioactive Isotopes in Forest Research."

The banquet, held on the evening of January 29th, was presided over by Dr. Charles C. Noble, Dean of Hendrick's Chapel of Syracuse University. With his usual humor he introduced the guests at the head table and presented Dr. William S. Carlson, President of the State University of New York. Dr. Carlson gave an outstanding talk on "Our Changing Climate" illustrating it with a movie taken during the Second World War. Dr. Carlson's talk centered around the retreat of glaciers and the receding of the Greenland ice-cap. Dr. Carlson played an important part in the laying out of air strips for the ferrying of planes from Great Falls in Montana across Canada, to Greenland, thence across to Spitzbergen, and then

to Scotland or England. These pictures, taken in color during both the summer and winter periods, gave a graphic idea of this little-known part of the world.

The banquet was attended by about 125 foresters and included some late arrivals from New England, who came to Syracuse to attend a special conference on debarking held at the College on the following day. The D. B. Smith Company of Utica, New York, donated door prizes.

The Friday morning session, devoted to Section business, was presided over by Chairman Winch. W. W. Clingan was elected to the Executive Committee.

D. B. Cook presented a report for the Utilization Committee, and emphasized the need for uses for beech and plantation thinnings. W. W. Clingan gave an excellent report for the Planting Practices Committee. John Curry spoke for the Cutting Practices Committee, and A. H. MacAndrews presented an interesting report for the Insect and Disease Committee. Ralph Unger concluded the Committee reports by speaking for the Public Relations Committee. Mr. J. B. D. Harrison of the Research Division of the Ontario Department of Resources and Development of Ottawa, Canada, spoke briefly on the place of research in forestry and what was being done in Canada in this field.

Tied in with the Section meeting were meetings of the District Foresters on January 27th and 28th; the Oak Wilt Conference held at the College on January 28th; the State Forest Practice Board meeting held in the evening of January 28th; and the Debarking Conference held at the College on January 30th. All of these meetings contributed to a busy week for foresters of the New York Section.

CHARLES E. BOONE,
Member, Public Relations Committee.

Southern California Section Meeting

President George L. Drake was the guest speaker at the January 16, 1953 meeting of the Southern California Section held at the Constance Hotel in Pasadena, California. He spoke on the development of the Shelton, Washington Sustained Yield unit stressing the cooperation of the local people and the Forest Service with the Simpson Logging Company in organizing this stabilized logging community.

President Drake reported briefly on the Montreal annual meeting, discussed Society activities and Sectional organization. This was followed by a film depicting fire prevention methods in the logging industry.

Chairman Henry Hellmers presided at the meeting at which chapter formation was brought before the Section.

Chairman Hellmers announced to the Section the recently received notice of the death of Russell T. Gheen on October 29, 1952 of a heart attack.

The next meeting will be held on February 20, 1953 at the Constance Hotel. The speaker at this meeting will be State Forester DeWitt Nelson.

SAMUEL F. GOSSARD,
Secretary-Treasurer.

Essay Contest for Western Students

The Western Forestry and Conservation Association has announced sponsorship of an essay contest for students of western forestry schools. First and second prizes are respectively $100 and $75, plus expense for both winners to the annual conference of the association in Seattle December 9-11.

Subject

Each contestant may select the subject of his essay. It should treat of a specific aspect of forestry that is of current vital concern. The subject may be either of regional or national interest. It may be in the field of silviculture, forest management, protection, utilization, economics, or administration. Within this sphere would be such subjects as competition in land use, slash disposal problems, economics of artificial reforestation, forest incendiarism, forest taxation reform, etc.

Eligibility

The contest is open to undergraduate forestry students, except seniors registered for the Fall of 1952, in any of the six accredited forest schools of California, Idaho, Montana, Oregon, Washington, and British Columbia.

Length and Form

Between 1500 and 2000 words; typed, double-spaced.

Procedure

Essays should be submitted to the respective deans by June 1, 1953, who will then select the two best essays submitted to each of them and forward the essays by July 15, 1953, to the Western Forestry and Conservation Association, U. S. National Bank Building, Portland 4, Oregon.

Judging

The Judges will determine the best essay submitted by each school and will then select the best two essays submitted. The judges' committee consists of Thornton T. Munger, Chairman, E. T. Clark, and E. L. Kolbe. They will rate the essays on the basis of grasp of subject, soundness, originality of thought, skill of treatment, conclusions ,diction, and form.

Awards

The first prize will be $100.00; the second prize $75.00; plus expenses to the annual conference of the Western Forestry and Conservation Association, which this year will be in Seattle, Washington, December 9-11. Both prize winners will be expected to attend. They will be introduced by the deans of their respective schools and receive their award from the president of the association. The winner of the first prize will read his essay to the conference. The two prize-winning essays will be made a part of the published proceedings of the conference.

Nominating Procedure Outlined for Election

A president, vice president, and nine Council members will be elected December 5, 1953. Their term of office will be for the two-year period 1954-1955. The Constitution provides that they must be Members (formerly Senior Members) or Fellows.

The present officers and Council members whose term of office expires December 31, 1953 are listed in the box above. They are eligible for renomination provided they give their consent in writing to serve if elected.

President George L. Drake has announced that he will not be a candidate for re-election.

Procedure

President and vice president. There must be at least two candidates for the office of persident; preferably more, so as to provide a contest. All candidates for president are considered as nominated also for vice president. The candidate receiving the next highest vote is declared elected vice president.

Members of the Council. There must be at least nine candidates for the Council; preferably more, so as to provide contests.

Nominating procedure. Nominations for officers and members of the Council are made by petition. If a sufficient number of nominations are not made

by petition, additional selections will be made by the Nominating Committee.

Nominating petitions are subject to the following conditions:

1. Each petition shall name but one candidate.

2. All candidates must be eligible to hold elective office; that is, they must be Members or Fellows in good standing.

3. Each petition must be signed by ten voting members (Junior Members, Members, and Fellows) who at the time of signing the petition are eligible to vote in the coming election.

4. A voting member may sign one nominating petition for president and one for member of the Council. (In other words, he may sign two, but no more.)

5. Petitions must be received in the Society's office in Washington, D. C. on or before October 2, 1953.

6. No nomination is valid until the nominee accepts the nomination in writing and agrees to serve if elected. Petitioners should obtain the written consent of the candidate in advance and submit it with the petition.

Form of petition. An acceptable form of nominating petition is as follows:

We, the undersigned voting members of the Society of American Foresters, hereby nominate ———————— to the office of president (or member of the Council) for the regular biennial election of 1953.

Nominations Received

For President: E. L. Demmon, Asheville, N. C. (Vice president, 1952-1953.)

For the Council: William C. Hammerle, New Orleans, La.

Galen W. Pike, Duluth, Minn.

R. H. Westveld, Columbia, Mo. (Member, 1952-1953.)

D. E. Hess, Gettysburg, Pa.

Nominating Committee

President Drake with the approval of the Council has authorized the following Nominating Committee to serve for this election.

Chairman, Harold B. Shepard, Research and Statistics Department, Federal Reserve Bank, Boston 6, Mass.

James D. Curtis, U. S. Forest Service, Ogden, Utah.

J. Nelson Spaeth, Department of Forestry, University of Illinois, Urbana, Ill.

Bruce F. Stewart, Texas Forestry Association, 811 Frank Avenue, Lufkin, Texas.

John B. Woods, Jr., Oregon State Board of Forestry, Salem, Oreg.

This committee will make no nominations of its own unless the members at large fail to make a sufficient number to meet Constitutional requirements. It is up to the members to decide whether they want to select their own candidates by petition, or have them hand picked by a small committee.

Certainly, nominations made by petition are the more democratic way. Hence, members are urged to get busy and choose the men they want to run their Society, and do it promptly.

The executive secretary will gladly be of assistance to any members who desire assistance or need additional information.

HAROLD B. SHEPARD, *Chairman,*
Nominating Committee.

Plans for the S.A.F. Meeting at Colorado Springs, Sept. 13-17, 1953

"Nature on Edge" epitomizes the dynamic and often violent biologic, human, and land-use tensions of the Rocky Mountain and Black Hills regions centering in Colorado. Colorado Springs at 6,200 feet is in the shadow of 14,109-foot Pike's Peak. The Pike's Peak region is characterized by low rainfall, high evaporation, and coarse soils which erode easily under the slightest abuse. Insolation is intense, aggrevating vegetative problems at every level. Torrential summer rains and dry, sunny winters add their problems at lower elevations. Logging is difficult to accomplish without erosion. The land in many places is overgrazed, over-cut, over-cropped, and over-run with tourists; yet still is beautiful and inspiring.

Human nature gets on edge. Gifford Pinchot was threatened with violence at a 1907 Denver meeting, called to protest creation of more national forests. The Fred Light Supreme Court case, which established the right to charge grazing fees upon national forests, was a Colorado challenge. In 1928, Jenks Cameron described hearings conducted by cattlemen in Colorado and Wyoming in terms identical to those used to describe Barrett subcommittee hearings of recent years. Current attempts to give national forest and B.L.M. lands to the states will be most vigorously supported in Colorado and Wyoming, wherein stockmen represent the dominant industry.

Many of the nation's most important rivers rise in Colorado's high mountains. The average elevation is 6,800 feet, making forests important for watersheds in a region in which water supplies determine populations and occupations. Aspect, slope, elevation, and aridity combine to make forests discontinuous and interspersed with grazing lands. In Colorado are most of the nation's 14,000 foot peaks. In the nearby Black Hills is the greatest uplift between the Rockies and the Appalachians. Tremendous landscapes have surrounded and dotted the region with many of the nation's most outstanding national parks. Multiple-use is inevitable, but difficult because vegetative controls are opposed by extreme climatic conditions.

In this land of two timberlines, foresters wondered why the plains were treeless, and established forests below the lower timberline. Early foresters, trained in humid regions, made many mistakes. A later forester told Monument Nursery officials that they might as well throw away their planting stock. This is the region of the controversial shelterbelt project.

In this region deer, elk, antelope, mountain sheep, and other creatures make greater yearly migrations than their counterparts in gentler lands. When insects, porcupines, prairie dogs, and other creatures go on a rampage, they make history here. Biological trends do not long escape notice; they soon are overwhelmingly evident.

Field trips and travel routes will show many striking examples of land and forest use and protection in a memorable fashion.

The General Session

There will be a half-day General Sesion, on the morning of Tuesday, September 15. Five general interpretive papers are planned for this session, to delineate clearly the peculiarities and problems of the Black Hills and Central Rockies for visitors as well as for professional men working within the region. These papers will present lucid evaluation of factors involved in the respective subjects covered, but will not infringe upon details and techniques more properly discussed within the subject-matter divisions. Each general paper should be

soundly based upon past experience, and should be unassailable in its conclusions, but should venture as far into policy for the future as reasonable certainty will permit. Papers must not exceed 20 minutes in presentation. The topics are:

1. Public Relations Problems of Wild Land Management in the Black Hills and Central Rocky Mountains. Reasons for the percentage patterns of private, state, and federal lands. The reasons for stresses between the various groups represented. Federal-state jealousies and competition. Private-public difficulties. The need for better informed citizenry. Possibilities for a general land-use and ownership policy. Changing emphases and uses as the result of increasing transportation, leisure time, and interests. Failures and successes in public relations.

2. Problems Fronting Forest Management in the Black Hills and Central Rocky Mountains. Land ownership patterns. The effects of elevation, aspect, slope, moisture distribution, and soils, upon establishment, growth, size, volumes, and cutting practices. The economies of the region in respect to population, remoteness from other sources of forest products, discriminatory practices and traditions, competition for financing, and consumption patterns. Approximately 60 percent of the text should relate to silvical and silvicultural problems, and 40 percent to economic phases.

3. Watershed and Range Significance in the Central Rocky Mountain Region. The distribution of principal watershed lands among private, state, and federal ownership. The interspersion of timber and grazing lands and their condition under varying use. Local differences in precipitation, interception, infiltration, and run-off as varied by elevation, soils, land use, and treatment. Relationships between land managers and water-using centers and projects. Erosion problems in relation to land-use practices, reservoirs, highways, and domestic water uses.

4. The Job of Protecting Black Hills and Central Rocky Mountain Forests. The threat of insect damage as the result of marginal site conditions, pure over-age stands, and critical utilization problems. The history, present status, and probable future of insect depredations within the region. (This talk should devote 60 percent of its length to insects, and 40 percent to fires and fungi. Erosion will be covered under watersheds and range significance.) The history and trend of fires and fungi within the region. The effects of elevation on fire, weather predictions, transportation, fuels, and burning rates. The pattern of causes peculiar to the region. The lack of "historical fires."

5. Recreation and Wildlife Problems in the Central Rocky Mountain Region. A comparison of changing values and resources. The changing land pattern and its probable future. The effects of changing land patterns upon wildlife populations and recreation practices. The importance of indigenous wildlife and recreation not to be duplicated elsewhere. The integration of wildlife and recreation with other land uses. Wilderness areas and insect control problems.

The Principal Address at the Annual Banquet

Plans are under way to secure an interesting speaker for the annual banquet who will cover an overall interpretation of the importance and future of forestry within the region, from a well-informed layman's viewpoint, of interest to attending for-

PANAMA

We take pleasure in announcing the PANAMA Hand, Portable, Flame Gun.

A tool designed for use in EMERGENCIES

It will ignite a solid line of fire as fast as a man can run—Quick Acting trigger enables operator to have "on or off" flame—A small amount of fuel remains on ground to promote quick firing—

IT CAN BE USED FOR } Extremely fast application of back fire—Roadside burning—Control burning—Brush burning and clean up work or any place where a hot fire is required instantly—

Operating pressure; 75 to 200#—Tanks tested to 400# Fuel; Straight kerosene or Fuel Oil and Gasoline mixture — Capacity; 1½ Gals. Flame reach; Approx. 6 ft.— Empty weight; 8#—

Price $31.50

PANAMA PUMP CO.
Hattiesburg, Mississippi

FORESTER
Seal-Tite
DRIP-TORCH

Approved for use by U. S. Forest Service

Proved superior in over 6 years of field service

No Flash-back
No fuel slopping
No air pump
No pressure build-up
No explosive vapors
No pre-heating
Instant operation

SAFE • EFFICIENT
RELIABLE • ECONOMICAL

Burns Diesel Fuel or Stove Oil
1¼ Gallon Capacity
Weight loaded 16 pounds

U. S. Patent No. 2376976

Write for descriptive folder and price list.

WESTERN FIRE EQUIPMENT CO.
69 Main St., SAN FRANCISCO, California

esters and their ladies. This address will be of moderate length, to make it most effective and memorable and to allow room for entertainment with local emphasis.

Note to Division Chairmen

Your Divisions undoubtedly have topics to discuss including those which could not be covered in last year's joint meeting with Canadian foresters at Montreal and those which are important as the result of the times. However, it is to be hoped that each Division can find emphases peculiar to the region of the meeting which will echo the theme of the convention and which can be illustrated by phenomena or practices found therein.

We shall be happy to coordinate your respective plans, to make sure that duplications do not occur between divisions and with the general discussions. You may wish to suggest important accents which we have failed to include in the outlines for the five general papers. If so, we shall promptly convey your suggestions to men giving these papers.

The Program Committee
DAVID H. CANFIELD,
T. J. FILLAS,
W. G. MCGINNIES,
HARRY WOODWARD,
J. V. K. WAGAR, *Chairman.*

Addendum

To the Directory of Consulting Foresters which appeared in the January 1953 issue of the JOURNAL OF FORESTRY should be added the following listing :

James W. Sewall Company, Consulting Foresters, Old Town Maine and Port Arthur, Ontario, Canada
Consultants: Frank M. Call, Charles G. Reed, Carleton C. Young, Jr., Theodore C. Tryon (S.A.F. Affiliate Member), John E. O'Donnell.
Territory: Northeast.
Specialization: 3, 4, 5, 8, 13, 15, 16, 17, 18. Also aerial photography.

New Officers of Forest Products Division

At the Biloxi meeting (Dec. 1951) it was decided there would be no meeting of the Forest Products Division at the Montreal (Nov. 1952) convention but that the officers would change at the beginning of 1953. The new slate of officers elected were:

Chairman, Fred Dickinson, Chairman, Dept. of Wood Technology, School of Natural Resources, University of Michigan, Ann Arbor.

Vice Chairman, R. C. Fraunberger, past vice president of Roddis Lumber and Veneer Co. of Canada, Ltd., Sault Ste. Marie, Ontario, Canada.

Secretary, Lincoln Mueller, Southwestern Forest Experiment Station, Tucson, Arizona.

ROBERT C. FRAUNBERGER,
Vice-Chairman,
Forest Products Division.

Richen Replaces Hagenstein as Assoc. Editor

Clarence W. Richen, Crown Zellerbach Corporation, Portland, Oregon, has been appointed by President George L. Drake to serve on the editorial board of the JOURNAL OF FORESTRY in the capacity of associate editor for *Forest Management and Engineering.*

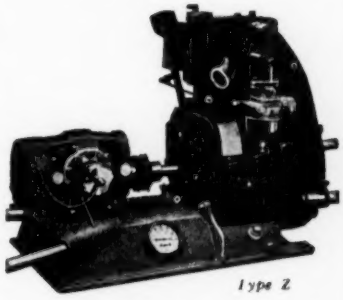
Mr. Richen replaces W. D. Hagenstein who has held that editorial assignment since 1946 and who requested some months ago that he be relieved because of the press of his duties with the Industrial Forestry Association. The Society's thanks are due Mr. Hagenstein for his long and faithful volunteer service.

The editorial assignment assumed by Mr. Richen is a vital one to the JOURNAL. In these days there is expanding industrial activity in the production and harvest of timber crops; there is also a growing appreciation of the multiple-crops of forest lands. Forest management, in all its ramifications, is receiving increasing attention from the profession and the public as it can be regarded as the culmination, the drawing together for practical application, of all other fields of professional knowledge and techniques.

Mr. Richen is well qualified for the assignment. He received his B.S. degree from Oregon State College in 1935 and later took graduate work in logging engineering. He entered the Forest Service with the Northwest Forest Experiment Station and left the station in September 1937 to serve as instructor in forestry at Oregon State College. In June 1942 he was employed as forester in the timber department of Crown Zellerbach Corporation. He now holds the position of chief forester. He was treasurer of the Columbia River Section, S.A.F., in 1943, chairman in 1950.

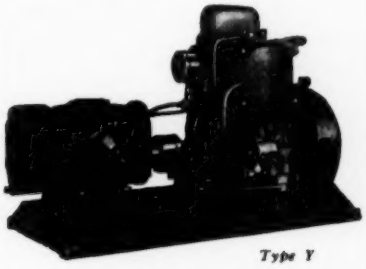
"Almost 30 Years Old and Still Going Strong"

That's what owners report about some of earliest models of Pacific Pumpers ever built.



Type Z

WHEN THE FIRST Pacific Pumper was introduced, it was a startling innovation. To produce an efficient pump light enough to carry by hand into rugged terrain but powerful enough to deliver an effective flow of water to combat forest blazes was news of national importance. Today, after nearly 30 years, many of the earliest Pacific Pumpers are still in use and are still the favorite of experienced fire fighters . . . mute testimony to the stamina and dependability built into all Pacific Pumpers . . . and to Pacific Pumper's policy of supplying parts for even the earliest models.



Type Y

Years of engineering research and thousands of practical field tests made possible the improvements incorporated in the famous Type Y Pacific Pumper . . . the most powerful unit ever built for its weight and size. The Type Y Pacific Pumper quickly won the approval of experienced fire fighters and fire fighting authorities . . . and is still the standby of many of the nation's most practical forest fire fighters. Newer, post-war models of Pacific Pumper are now available . . . all even lighter, more compact and durable and more versatile for a variety of purposes.

Write for data on the complete line of Pacific Pumpers, Pacolized hose and accessories.

PACIFIC *Marine Supply Co*
SEATTLE 1, WASHINGTON

Maine Alumni Asked for Help

In preparation for a Symposium on October 1, 2, and 3rd of this year to commemorate the 50th anniversary of the Forestry Department at the University of Maine, a letter with an enclosed questionnaire was sent to each of approximately 1,000 alumni (including some non-graduates) of the department. As of today there have been 343 replies and to make the departmental records complete, it is highly desirable that each alumnus fill in and return his questionnaire promptly.

Coming Events

Southwestern Section

The next meeting of the Southwestern Section will be held in Flagstaff, Arizona, on April 24 and 25. The meeting will feature fire equipment, and most of the protection agencies in the Section will take part in the program.

The Section chairman is R. D. Holtz, 1017 West Indianola Ave, Pheonix, Ariz.

Central Rocky Mountain Section

A dinner meeting of the Central Rocky Mountain Section will be held jointly with the Council of the Society in Denver, probably on May 22. The Council's mid-year business meeting is tentatively scheduled for Denver late in May.

The Section secretary is Dan Green, 3020 Newton, Denver, Colorado.

Northern Rocky Mountain Section

The Northern Rocky Mountain Section has scheduled a series of spring meetings in Missoula, Mont. as follows:

April 15. 7:30 p.m. American Legion Hall. "What Protection do our Watersheds Need?"

May 16. All day field trip, East Fork of Lolo Creek. "Protection Problems of Western Montana."

The Section chairman is A. E. Spaulding, U. S. Forest Service, Missoula, Mont.

CORRECTION—Dates of Columbia River Section are April 17 and 18, **Not** April 9 and 10 as previously reported.

Columbia River Section Meeting

The annual meeting of the Columbia River Section will be held in Portland, Oreg. on April 17 and 18. A field trip has been scheduled through the Portland City Forest on the afternoon of April 17. The following day there will be four one-hour sessions arranged by the Chapters, and a dinner meeting that evening.

The Section secretary is Kenneth Burkholder, Box 705, Bend, Oreg.

Gulf States Section

The annual meeting of the Gulf States Section will be held in Galveston, Tex., May 4 and 5, at the Galvez Hotel.

The chairman of the Section is Dr. A. D. Folweiler, Texas Forest Service, College Station.

Convenient, Easy Way To Remove Bark...

ATLAS "A" DEBARKING COMPOUND

(LIQUID SODIUM ARSENITE)

When treated with Atlas "A" Debarking Compound, the bark of many species of trees becomes permanently loosened. As a result, it can be easily peeled at a convenient time and the wood harvested the year 'round.

This chemical method is used by many leading pulpwood companies and is considered a cheap practical way to debark pulpwood. It is also used in preparing fence posts and poles where bark removal is desired, particularly prior to treating with a wood preservative.

One gallon Atlas "A" Debarking Compound is sufficient to treat 300 to 500 trees. It is quickly applied with a paint brush to a sap-peeled girdle around each tree. Best time to apply is in May or June.

NOW is the time to check on Atlas "A" Debarking Compound!

Photo by N. E. Pulpwood Research Center

Write for Bulletin on Debarking

CHIPMAN CHEMICAL COMPANY, INC.
Dept. 1, Bound Brook, New Jersey

FOREST METEOROLOGIST
Fire Danger Rating . . . Weather Instruments
Sales and Service . . . Weather Modification
Research . . . Forecasts and Advisories
J. B. "Ben" MELIN
2806 32nd Ave. S. Seattle 44, Wash.
Telephone RAinier 0356

Forest Products Research Society

The seventh annual meeting of the Forest Products Research Society will be held June 15, 16, and 17 in Memphis, Tenn., it has been announced by Kenneth G. Chesley, F.P.R.S. president and director of research at Crossett Lumber Company, Crossett, Ark.

Announcement of Applicants

Applicants for admission, advancement, or reinstatement whose membership applications were received in the Society office during the month of February are listed below.

Action regarding the eligibility of these applicants will be taken by the council as of May 1, 1953. Any communications from voting members relating to the membership eligibility of any of these applicants should be received in the Society office prior to that date.

Allegheny Section

Student Grade

Pennsylvania State College

Hafley, W. L. — Peters, T. E.

West Virginia University

Funkhouser, W. E.

Junior Grade

Folsom, N. E., 428 West College Ave., State College, Pa.; Pa. State, B.S.F., 1953. (Student, 1952).

Horner, R. E., 1639 Monroeville Ave., Turtle Creek, Pa.; Pa. State, B.S.F., 1953. (Student, 1951).

Hromada, C. J., 2318 Woodward Ave., Pittsburgh, Pa.; Purdue Univ., B.S.F., 1953. (Student, 1951).

Larsen, H. S., 54 Gillispee Ave., Fairhaven, N. J.; Rutgers Univ., B.S., (Agric.), 1950; Mich. State, M.S.F., 1953. (Student, 1951).

Montgomery, L. H., Jr., 115 Worrell St., Chester, Pa.; Pa. State, B.S.F., 1953. (Student, 1951).

Rhines, S. W., Hallton, Pa.; Pa. State, B.S.F., 1953. (Student, 1952).

Rupp, C. W., 1137 Race St., Ashland, Pa.; Pa. State, B.S.F., 1953. (Student, 1952).

Ward, R. L., Box 42, Titusville, N. J.; Univ. of Mo., B.S.F., 1953. (Student, 1951).

Wenner, E. J., 223 Third St., Fairhaven, N. J.; Pa. State, B.S.F., 1953. (Student, 1951).

Zimmer, M. R., 323 Riverside Drive, Hanesdale, Pa.; Pa. State, B.S.F., 1953. (Student, 1952).

Member Grade

Wheeler, J. M., Pa. Representative, Grant Paper Box Co., Pittsburgh, Pa.; Wa. Univ., B.S.F., 1941. (Junior, 1945).

Appalachian Section

Junior Grade

Gibson, M. C., Pres., Cape Fear Wood Corp., Elizabethtown, N. C.; Univ. of Fla., B.S. B.A., 1938. (Affiliate, 1950).

Harris, H. M., 3 Pine Tree Rd., Asheville, N. C.; N. C. State, B.S.F., 1950. (Student, 1951).

Holdren, R. K., 1406 Duke Univ., Durham, N. C.; Pa. State, B.S.F., 1953. (Student, 1952).

Member Grade

Nichols, C. R., Jr., Dist. Forester, S. C. State Comm. of Forestry, Kingstree, S. C.; State Univ. of N. Y., B.S.F., 1943. (Junior, 1947).

Stelling, C. H., Mgr., Cleveland Plant, Georgia-Pacific Plywood Co., Cleveland, S. C.; Univ. of Ga., B.S.F., 1941. (Junior, 1946).

Central Rocky Mountain Section

Student Grade

Colorado A & M College

Amidon, E. L. — Knaus, P. P.
Betts, R. E. — Larson, M. M.
Binkley, V. W. — Lewis, T. E.
Boldt, C. E. — Miller, D. L.
Chapparo, W. J. — Robison, D. L.
Dutton, H. M. — Schamberger, J. E.
Fenner, W. M. — Simon, C. L.
Hribernick, R. A.

Central States Section

Student Grade

University of Michigan

Ackerman, J. E. — Cowan, D. R.

Junior Grade

Ehrlich, G. H., 9530 S. Indiana Ave., Chicago 28, Ill.; Iowa State, B.S.F., 1953. (Student, 1951).

Haertle, L. A., Dist. Forester, State of Ill., Dept. of Cons., Carthage, Ill.; Mont. State, B.S.F., 1952.

Hartig, R. R., 215 S. Chauncey, W. Lafayette, Ind.; Purdue Univ., B.S.F., 1953. (Student, 1951).

Heinz, R. E., 221 W. Main St., Carlinville, Ill.; Univ. of Mich., B.S.F., 1953. (Student, 1951).

Hermann, R. A., 1346 Oakham Court, Willow Run, Mich.; Univ. of Mich., B.S.F., 1953. (Student, 1951).

McGregor, W. H. D., 411 N. State St., Ann Arbor, Mich.; Colo. A. & M., B.S.A., 1951 Univ. of Mich., M.F., 1953. (Student, 1952).

Mynott, D. E., 515 E. Jefferson, Ann Arbor, Mich.; Paul Smith's College, A.A.S., 1950; Univ. of Mich., B.S.F., 1953. (Student, 1952).

Novy, R. L., 2910 Iroquois Ave., Detroit, Mich.; Univ. of Mich., B.S.F., 1953. (Student, 1952).

Ott, J. H., 119 Fulton St., Grand Haven, Mich. Mich. State, B.S.F., 1953. (Student, 1952).

Williams, H. J., 417 S. Ashley St., Ann Arbor, Mich.; Univ. of Mich., B.S.F., 1953. (Student, 1951).

Worley, P. J., F.P.H.A., 221-4 W. Lafayette, Ind.; Purdue Univ., B.S.F., 1953. (Student, 1951).

Youngren, H. L., 238 Westchester Ave., Chestertown, Ind.; Purdue Univ., B.S.F., 1953. (Student, 1951).

Columbia River Section

Student Grade

Oregon State College

DeSoza, H. L. — Holloter, G. C.
Glidewell, L. D. — Mulholland, K.
Hill, L. L. — Rankin, A. W.

Junior Grade

Behr, R., Forester, Pope and Talbot, Inc., Oakridge, Oreg.; Univ. of Wash., B.S.F., 1942.

Grove, J. D., Fields, Oreg.; Oregon State, B.S.F., 1953. (Student, 1952).

Kingsley, R. D., Dist. Engr., Collawash Rgr. Sta., Estacada, Oreg.; Oregon State, B.S.F., 1951.

Morrison, L. W., Forester, Bur. of Land Mgmt., Coos Bay, Oreg.; Mont. State, B.S.F., 1952.

Thompson, R. L., Forester, Bur. of Land Mgmt., Roseburg, Oreg.; Univ. of Calif., B.S.F., 1952.

Wiley, K. N., Asst. Forester, Weyerhaeuser Tbr. Co., Springfield, Oreg.; Colo. A. & M., B.S.F., 1949; M.F., 1950.

Member Grade

Dahl, H. A., Forester, U.S.F.S., Union, Oreg.; Oregon State, B.S.F., 1938; M.F., 1945 (Junior, 1947).

Affiliate Grade

Mezger, W. L., Jr., Dist. Forester, Yacolt Dist., Weyerhaeuser Tbr. Co., Longview, Wash.; State College of Wash., B.S., (Forestry), 1948.

Peters, D. L., Dist. Forest Rgr., Fremont Natl. Forest, Lakeview, Oreg.; State College of Wash., B.S., (Forestry), 1939.

Gulf States Section

Junior Grade

Sandoz, J. R., Forester, Int. Paper Co., Springhill, La.; La. State, B.S.F., 1950.

Underwood, D. L., Forest Tech., Gaylord Container Corp., Bogalusa, La.; West Virginia Univ., B.S.F., 1950.

BELSAW ... Over 30 Years in the Development and Manufacture of PORTABLE SAWMILL EQUIPMENT

Thousands of Belsaw Portable Sawmill users throughout the world ... Belsaw goes right to the trees, thus getting more lumber from all the cut timber. For low cost, high quality production the Belsaw line leads the field. Write today for Free Book, "How To Make Lumber."

BELSAW MACHINERY CO

8912 Field Building, Kansas City 11, Missouri

REFORESTATOR

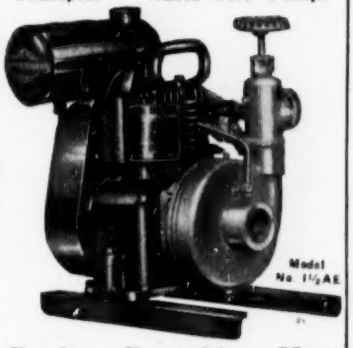
Mechanical Tree Planter

Manufactured by

L. W. MERIAM CO.

Elsie, Michigan

Champion Portable Fire Pumps



Darley Portables Must Be Good! State of Minn. Forestry Dept. Has 45 Champions in Service!

Darley Champion Portable Fire Pumps were selected over other makes by the State of Minnesota for hard service in the State Forestry Department.

Darley Engineering Brings You More Water and Higher Pressures with Champion Lightweight Portables.

Capacity up to 250 gallons per minute. Pressures up to 125 lbs.

Write for 108 page catalog of Fire Equipment. Also 44 page booklet of Fire Pumps and Fire Trucks.

W. S. DARLEY & CO., CHICAGO 12

Manufacturers of Champion Fire Pumps and Champion Fire Apparatus

Member Grade

Van Zandt, R. W., Pulpwood Dealer and Cons. Forester, 37 Westwood Blvd., Alexandria, La.; Univ. of Ga., B.S.F., 1942. (Junior, 1946).

Walker, E. S., Forester, S. H. Bolinger and Co., Plain Dealing, La.; La. State Univ., B.S.F., 1938. (Junior, 1946).

Affiliate Grade

Steen, C. N., Cons. Forester, Int. Paper Co., Olla, La.; L.P.I., B.S., (Forestry), 1952.

Inland Empire Section

Student Grade

University of Idaho
Tiedemann, R. K.

Junior Grade

Bangs, W. C., Logging Supv., San Poil Lbr. Co., Republic, Wash.; Mont. State, B.S.F., 1951.

Gibson, A. L., Forest Insect Surveys and Research, Forest Insect Lab., Coeur d'Alene, Idaho; State Univ. of N. Y., B.S.F., 1920. Reinstatement.

Marr, W. R., Univ. of Idaho, Moscow, Idaho; Univ. of Idaho, B.S.F., 1953. (Student, 1951).

Intermountain Section

Junior Grade

Hill, J. W., Dist. Forest Rgr., Cache Natl. Forest, Randolph, Utah; Utah State Agric. College, B.S.F., 1951; M.S.F., 1952.

Lieurance, R. E., 1138 E. Benton St., Pocatello, Idaho; Univ. of Idaho, B. S. F., 1952. (Student, 1952).

New England Section

Student Grade

Yale University
Andrews, J. R. T.

Junior Grade

Fuller, S. E., Cruiser, Prentiss and Carlisle Co., Inc., Bangor, Me.; Univ. of Me., B.S.F., 1950.

Member Grade

Carlisle, G. D., Forester and Director, Prentiss and Carlisle Co., Inc., Bangor, Me.; Univ. of Me., B.S.F., 1935. Reinstatement.

New York Section

Student Grade

State University of New York
Hessel, A.

Junior Grade

Crosman, D. T., 8022 5th Ave., Brooklyn, N. Y.; Univ. of Me., B.S.F., 1953. (Student, 1952).

Meixter, D. C., 16 Orsini Drive, Larchmont, N. Y.; State Univ. of N. Y., B.S.F., 1953.

Member Grade

Thomson, R. W. B., Forester, Ontario Paper Co., Ltd., Heron Bay, Ontario, Canada; Univ. of N. B., B.S., (Forestry), 1943. (Junior, 1949).

Affiliate Grade

Dixson, R. A., Research Forester, Howard Smith Paper Mills, Ltd., Cornwall, Ontario, Canada; Univ. of N. B., B.S., (Forestry), 1950.

Northern California Section

Student Grade

University of California

Davies, G. R. Wade, D. N.
Schwarz, H. C. Wilde, F. B.

Junior Grade

Bjornsen, A. M., Cruiser, Hammon, Jensen and Wallen, Oakland, Calif.; Univ. of Calif., B.S.F., 1946.

Rose, J. A., 2315 Dwight Way, Berkeley, Calif.; Univ. of Calif., B.S.F., 1953. (Student, 1951).

Northern Rocky Mountain Section

Student Grade

Montana State University

Jacobsen, A. L.
Leader, R. J. Swift, D. D.

Member Grade

Folsom, L. L., Survey and Cartographic Engr., U.S.F.S., Missoula, Mont.; Univ. of Idaho, B.S.F., 1940. (Junior, 1946).

Ozark Section

Junior Grade

McElroy, J. W., Forester, U.S.F.S., Ozark Natl. Forest, Mountain View, Ark.; Iowa State, B.S.F., 1949.

Mugford, D. G., Asst. Forester, Licking State Nursery, Licking, Mo.; Mich. State, B.S.F., 1949.

Member Grade

Fox, W. S., Co-Owner, W. S. Fox and Sons, Pine Bluff, Ark.; Ouachita College, Arkadelphia, Ark., B.S., 1915. (Af.42J48).

Miller, T. B., Prod. Mgr., Gideon-Anderson Lbr. Co., Gideon, Mo.; Univ. of Mich., B.S.F., 1947; M.F., 1949. (Junior, 1948).

Affiliate Grade

Hanna, J. N., Asst. Forester, Crossett Lbr. Co., Crossett, Ark.; Okla. A. & M., B.S., (Forestry), 1950.

Puget Sound Section

Student Grade

University of Washington

Dillard, A. H. Joyce, R. L.
Driscoll, T. J.

STOP THAT FIRE

RANGER PAL JR. FIRE PLOW

The Ranger Pal Junior fire plow is a hand or hydraulic lift middle-buster with coulter and discs. Drawbar connection built of 1" cast steel T-beam. Has 16" coulter roller bearing assembly with grease seal, mounted ahead of 14" tempered steel middle-buster, capable of cutting large underground roots. One 16" harrow disc bearing assembly is mounted on each side and slightly behind the middle-buster wing which turns the sod over and out. Depth of plowed line may be adjusted by either the presence or absence of two spool weights attached on rear of plow. Leaves a 5 foot earth line and can be drawn by any piece of light equipment, Ford type tractor, jeep or power wagon. Built compact and sturdy for ease in handling and reduced maintenance costs. Tested and proven by Louisiana Forestry Commission. Made by makers of Ranger Pal Fire Plow. Not designed to supersede the Ranger Pal but adapted for lighter equipment. Mass production price at $385.00 each, f.o.b. shop. Workmanship guaranteed.

Ranger Pal Fire Plow production price at $485.00 each f.o.b. shop. Write for further details on both plows.

TWIN CITY WELDING & MACHINE SHOP
301 Jonesboro Highway
WEST MONROE LOUISIANA

The New **Scythette** POWER SCYTHE

CUTS WEEDS, GRASS, REEDS 4 TIMES FASTER THAN ORDINARY METHODS

NEW POWER • NEW ENGINEERING

New equipped with double power, double fuel capacity. Trims weeds on rocky or uneven ground. Cuts grass or weeds close to buildings. Clips reeds or underwater growth. Cuts with ease wherever a man can walk, wade, or row a boat. Equipped with new two h. p. motor, one quart capacity gas tank, 20-inch oscillating cutter bar. Weighs only 26 pounds.

a twist of the wrist and the SCYTHETTE becomes the **Sawette**

America's most revolutionary chain saw cuts trees, or any growth up to 6" in diameter, level with terrain while operator is in upright position.

WRITE FOR FREE LITERATURE

Hoffco, inc.
RICHMOND, INDIANA

Southeastern Section

Student Grade

Alabama Polytechnic Institute
Vickery, W. W.
University of Georgia

McLees, J. H. Sheppard, J. A.

Junior Grade

Clark, W. D., 704 S. Jefferson, Perry, Fla.; La. State Univ., B.S.F., 1953. (Student, 1951).
Cook, F. M., State-County Forester, Muscogee County Forest Univ., Columbus, Ga.; Univ. of Fla., B.S.F., 1950. Reinstatement.

Southern California Section

Member Grade

Lloyd, R. M., Salesman, Ed. Fountain Lbr. Co., Los Angeles, Calif.; Univ. of Calif., B.S.F., 1942. (Junior, 1946).

Southwestern Section

Junior Grade

Grassi, D. P., Jr. Forester, U.S.F.S., Springerville, Ariz.; Utah State Agric. College, B.S.F., 1952.
Pinneo, J. E., Dry Kiln Supt., Southwest Lbr. Mills, In., McNary, Ariz.; Iowa State, B.S.F., 1949.

Affiliate Grade

Kolliner, R. E., Sales Mgr., Ponderosa Mills of Mexico, El Paso, Texas; Univ. of Minn., B.B.A., 1940.

Upper Mississippi Valley Section

Junior Grade

Eng, D. W., Forester, Iron Range Resources and Rehabilitation, Hibbing, Minn.; Univ. of Minn., B.S.F., 1952.
Larsen, D. M., Forester, Iron Range Resources and Rehabilitation, Grand Rapids, Minn.; Univ. of Minn., B.S.F., 1949.
Nixon, R. J., 1745 N. Pascal St., St. Paul, Minn.; Univ. of Minn., B.S.F., 1953. (Student, 1951).

Affiliate Grade

Johnson, M. H., Logging Contractor, Littlefork, Minn.

Associate Grade

Jensen, C. L., Nurseryman, Esmond, N. Dak.; North Dakota Agric. College, B.S., (Botany); 1923.

Washington Section

Junior Grade

Amig, A. P., Cartographer, U.S.D.I., Geological Survey, Arlington, Va.; Pa. State, B.S.F., 1951.

Member Grade

Clocker, E. H., U.S.F.S., Washington, D. C.; Iowa State, B.S.F., 1936. Reinstatement.
Owens, J. M., Asst. Branch Chief, Office of Price Stabilization, Washington, D. C.; State Univ. of N. Y., B.S.F., 1938. (Junior, 1949).

Wisconsin-Upper Michigan Section

Junior Grade

Blaisdell, A. J., Jr., Draftsman, Square D Co., Milwaukee, Wis.; Iowa State, B.S.F., 1950. Iowa State, B.S.F., 1950.
Bonner, D. F., 1202 Seymour St., Sault Ste Marie, Mich.; Mich. State, B. S. F., 1953. (Student, 1952).

Foreign

Junior Grade

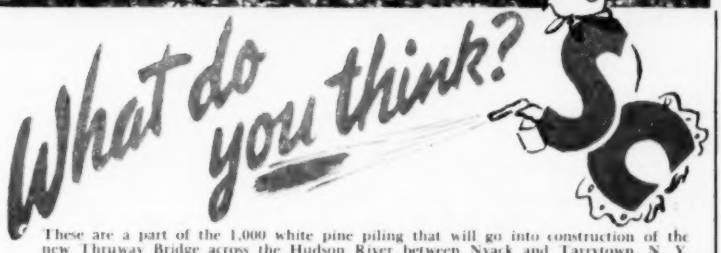
Miller, R. H., Exec., and Motor Officer, A Co. 64 Tank Bn., Cnorwow, N. Korea; Mich. State, B.S.F., 1950.

Member Grade

Spangler, G. P., Mgr., Cavalla Plantations, Liberia, West Africa; Pa. State, B.S.F., 1938; M.F., 1946. (Junior, 1946).

Corresponding Grade

Gevisser, D. J., Research Officer, Acme Box Factory, Ltd., Durban, South Africa; Univ. of Stellenboch, B.S.F., 1949; State Univ. of New York, M.F., 1951, Comm. on International Relations.



These are a part of the 1,000 white pine piling that will go into construction of the new Thruway Bridge across the Hudson River between Nyack and Tarrytown, N. Y. Each from 80 to 90 feet tall, they are cut under the supervision of Pond & Moyer Co., consulting foresters of Ithaca, N. Y., from holdings belonging to a private club in the Southern Catskill Mountains. Before cutting, each tree is marked with two bands of SOUTHERN GLO Tree Marking Paint. (—photo by Elmer Phillips, Director of Visual Aids, Cornell University.)

—More about small-opening containers for Southern Glo Ready-Mix paint:

Response still pours in to a recent reader-suggestion for a pouring-type container. Introduced as eliminating need for a funnel, an advance permitted by SOUTHERN GLO's new stay-mixed formula #71020 which requires little or no stirring, this container suggests other advantages to other users.

For instance, a hearty ok from Florida brands this as the answer to faulty-fitting tops, difficult to close after initial opening. In addition, this same forester points out, the smaller opening would expose less area to falling trash that clogs the foresters' guns.

Because of the general enthusiasm shown this suggestion, we are proud to announce that, with the publication of this column, SOUTHERN GLO Ready-Mix tree-marking paint is now available also in the new small-opening container at no additional cost. New containers are packed six to a case; conventional round cans, four to a case. Be sure to specify on your order if you care to try out this new container.

—about a "spare" paint carrier for refills in the field:

Most foresters marking in heavy stands use more than a gallon of paint a day; some go as high as three or four gallons daily in marking pulp wood. Yet most guns hold a quart of paint.

Thus, a forester who travels any distance from his starting point must either carry a paint can in one hand, operating his gun with the other . . . or he must make a number of otherwise pointless trips to and from his supplies in order to re-load.

Inspired perhaps by this talk of improved containers, two foresters in widely separated locations, have come up with the "spare" suggestion . . . but with specifications as divergent as their areas of operation. A forester in the North Woods believes this should be a back-pack, which he feels allows free arm action.

And in South Carolina, a forester contributes the side-pack suggestion, believing that a back-pack would catch in underbrush.

Perhaps the pack location should vary with the area in which you operate . . . or is there still more conclusive evidence favoring one or the other?—Or how about a container strapped around your waist in the manner of the army canteen? We'd be interested in your opinion. How much paint do you use in a day?—Is the "spare" of potential value to any number of foresters? Where would *you* rather carry it? What do you think?

SOUTHERN COATINGS & CHEMICAL CO.

Dept. A-2, Sumter, S. C.

THE LOWTHER
TREE PLANTER PLANTS
10,000 SEEDLINGS PER DAY!

With the Lowther Tree Planter, trees are properly planted for maximum survival in any soil because they have been given the right start.
Three distinct models available to cover all soil conditions and terrain.

●

For details write:

THE HARRY A. LOWTHER COMPANY
INDUSTRY AVE., JOLIET, ILL.
By The Makers Of The Famous Lowther C-Saw

SILVA COMPASS
Simpler — More Accurate
Recommended by foresters for cruising. Easier to use, faster, positive. Direct course readings. Write for free literature and instructions.
SILVA, INC., Dept. J, LaPorte, Ind.
RANGER MODEL

BRANDING HAMMERS
For branding logs, poles, ties, and pulpwood. Trade-mark your products.
A. R. SMITH
Marking Devices
10003 S. E. ECKLER AVENUE
PORTLAND, OREGON

Forestry News

National Forest Congress Called by the American Forestry Association

Conservationists from all over America will convene in Washington, D. C., on October 29, 30 and 31 to re-examine all aspects of forest management and protection on public and private lands in the United States.

Called by The American Forestry Association, this American Forest Congress—the fourth in the 77-year history of the Association—will be in the nature of a national "town meeting" conducted on democratic principles of free and open discussion, according to Don P. Johnston, president of the A.F.A.

The Congress will follow a conference at Higgins Lake, Michigan, June 29, 30 and July 1 when members of the original Higgins Lake Committee of 1946 will confer with the Board of Directors of The American Forestry Association for the purpose of modernizing A.F.A.'s 1946 30-point Program for American Forestry to meet changing conditions.

The main objectives of the October Congress will be:

(1) To bring the American public up-to-date on the current situation in respect to the proper management and protection of public and private forest resources in the nation.

(2) To bring together representatives of government, industry, agriculture, labor and the public for joint consideration of the forest situation.

(3) To consider such revisions of A.F.A.'s platform for American forestry as the Higgins Lake Committee may recommend.

"Previous Forest Congresses of the A.F.A. were all called at crucial points in the history of American conservation and the 1953 conclave will be no exception," commented President Johnston, of Wake Forest, North Carolina. "With a new administration in power and in view of changing conditions and new concepts, it is urgently important that the American public be kept informed on the course of American forestry."

The first Forest Congress in Cincinnati, Ohio, in 1882 marked the beginning of a forceful forestry movement in the United States and, in an era of reckless exploitation, laid the foundation for a national forestry structure. The second Congress in Washington, D. C. in 1905, led to the establishment of the U. S. Forest Service and the national forests. President Theodore Roosevelt was the keynote speaker. The third Congress, also in Washington in 1946, presented A.F.A.'s nationwide appraisal of forest resources to the public and resulted in a national platform for concerted forestry endeavor.

Over 1000 leaders in science, industry and education attended all three meetings.

Arkansas Creates New State Forestry and Parks Commission

A recent act of the Arkansas legislature, approved by the governor, abolished the Division of Forestry and Parks in the Arkansas Resources and Development commission, and created an independent State Forestry and Parks Commission.

The act provides that the state forester shall have had technical training in forestry. Fred H. Lang of Little Rock is the state forester.

The operations of the new Forestry and Parks Commission will be financed by a severance tax on forest products, lumber, pulpwood, veneer and stave bolts, crossties, poles and piling.

Wisconsin Appoints Special Advisory Committee

A special committee on forest entomology and pathology has been appointed by Chairman Guido Rahr of the conservation commission to serve in an advisory capacity to the commission on problems arising in those fields. The increase in forest damaging insects is one of the concerns of the committee.

The committee consists of D. C. Everest, Rothschild, representing the wood use industry, chairman, Charles Smith, Wausau, and Douglas Hunt, Wautoma, representing the commission, and C. L. Harrington and Allan S. Haukom, representing the conservation department.

Forest Policy for New Hampshire

A Forest Policy for New Hampshire was presented to Governor Sherman Adams just before he left the state to

become Presidentiai Assistant. The report was prepared by a group of some 60 citizens representative of state, federal, and private interests. In it the Governor's Forest Policy Committee points out that 4.7 million acres, or 84 percent of the state, is in commercial forest land, but that only 12 percent of the timberland supports more than 5,000 board feet per acre. Twenty-five percent, however, of the state's employed persons are supported by the forests. There are 35,000 owners and 700 timber-based industries. The policy statement calls for increased research in management and utilization, more educational activities, taxation encouragement of forest management, addition of five percent more to public forests (17 percent is now publicly owned and 22 percent is suggested as a ceiling), and adoption of voluntary controls on cutting practices.

N.L.M.A. Names Forestry Advisory Committee

The National Lumber Manufacturers Association announced today the appointment of a 12-man Forestry Committee to augment the work of its Committee on Forest Conservation.

The establishment of a forestry advisory committee was approved by N.L.M.A.'s Board of Directors at their Annual Meeting last November in Washington, D. C.

The new group will advise the Committee on Forest Conservation on important national problems in the field of forestry. All members are recognized authorities in the field of forestry and forest land management with many years of practical experience.

They are: Howard Bennett, forester of the Appalachian Hardwood Manufacturers, Inc., Cincinnati, Ohio; R. E. Broderick, executive secretary of the Northeastern Lumber Manufacturers Association, New York City; Emanuel Fritz, consultant to the California Redwood Association, San Francisco; William B. Greeley, vice president of the West Coast Lumbermen's Association, Seattle, Wash.; W. D. Hagenstein, forest engineer of the Industrial Forestry Association, Portland, Ore.; William C. Hammerle, forester of the Southern Pine Association, New Orleans, La. Ernest L. Kolbe, forester of the Western Pine Association, Portland, Ore., H. F. Lathrop of Lightsey Bros., Miley, S. C.; Stuart Moir, forest counsel of the Western Forestry and Conservation Association, Portland, Ore.; H. F. Lathrop of field, secretary-treasurer of the California Forest Protective Association, San Francisco; George W. Stanley of the Kirby Lumber Corp., Houston, Tex., and O. T. Swan, secretary-manager of the Northern Hemlock and Hardwood Manufacturers Association, Oshkosh, Wisc.

Mr. Hammerle has been named chairman of the new committee.

ROBERT D. MCCULLEY has been named chief of the Division of Forest Management at the Lake States Forest Experiment Station. He succeeds Francis H. Eyre, who recently transferred to Washington, D. C.

For the past four years McCulley has been in charge of timber management research in the tidewater section of North Carolina and Virginia. His previous experience includes work in the turpentine forests of the south, on the shelterbelt planting project in the plains states, and on national forests of California.

He is a graduate of the University of California.

National Forest Receipts Exceed Expenditures

National forest receipts exceeded expenditures by $11,383,571 for fiscal year 1952, the U. S. Department of Agriculture has announced.

During the year ended June 30, 1952, the Forest Service collected $71,402,511 from the sale of timber, grazing, land-use, and water power permits on national forests. This includes $1,682,313 held in escrow pending settlement of questions relating to the status of certain lands in Oregon and Alaska.

Expenditures for operation, maintenance, and development of the national forests during the same period totaled $60,018,940 covering: personnel; general administration; fire protection; insect control; flood control; reforestation and revegetation; acquisition of land; construction and maintenance of range improvements; roads and trails, and other improvements.

A little over $12 million was spent on such capital investments as reforestation, reseeding, buildings, and road construction.

★ ★ ★

The first American lumber mill was established in 1608.

SEEDS FOR NURSERYMEN

TREE — SHRUB — PERENNIAL —

FLOWER — VEGETABLE

Correspondence with Seed Collectors Invited

HERBST BROTHERS

Established 1876

678 BROADWAY NEW YORK 12, N. Y.

RxB* *IS PRESCRIBED BURNING "Just What the Forester Ordered"*

Why do Jerseymen prefer the CRANCO TORCH?

Write:

BOHL BROS., *Distributors*

1000 Pennington Road, Trenton 8, N. J.

**RxB is the trade mark of the CRANCO COMPANY, furthering sound forestry practice through the intelligent use of fire in forest management.*

Washington State Legion Post Receives 1952 Tree Farm Award

American Legion Post 76, Arlington, Wash., was recently awarded the 1952 tree farm certificate of the Industrial Forestry Association for its work in reclaiming 120 acres of Puget Sound logging cutover and establishing it as a memorial forest.

Charles S. Cowan, manager of the Washington Forest Fire Association, presented the award to Howard Christianson, post commander, at a dinner meeting sponsored by the post's Women's Auxiliary. Bernard Orell, Washington state forester and other executives of the Washington State Division of Forestry, the U. S. Soil Conservation Service, and the U. S. Forest Service, themselves veterans, attended the ceremony.

Northeast F.P.R.S. Meeting

The spring meeting of the Northeast Section, Forest Products Research Society, will be held at the Hotel Eastland in Portland, Maine, May 7-8. Sixteen prominent authorities will discuss "Efficient Log and Lumber Handling, Processing and Utilization."

Coronado National Memorial Established in Arizona

Establishment by proclamation of the President of the Coronado National Memorial in southern Arizona on the United States-Mexico boundary was announced recently by the National Park Service.

Located entirely within the federally-owned Coronado National Forest, this 2,745 acre scenic area includes Coronado Peak which commands a sweeping view of the region explored by Francisco Vasquez de Coronado and his men. Park Service spokesmen expressed the hope that the Mexican Government will soon set aside land in Sonora containing the historic expedition's starting point, so that one of the significant events in early North American history may be commemorated by an international memorial.

* * *

THE LARGEST pest control program the world has ever known is the spraying of 670,000 acres of Douglas fir forests in Oregon and Washington to kill spruce budworm.

N.E.F.I. Names Whipple Tamworth, N. H. District Forester

Walter L. Koenig, chief forester of New England Forest Industries, Concord, N. H., announces the appointment of Parker Whipple as district forester in the Tamworth area.

Mr. Whipple, a graduate of Harvard University with an M.A. in forestry from Yale, is a hardwood specialist with several years' experience in private forestry in New England. His first assignment is to place under management the extensive lands of the Blair Vermont Plywood Company in northern Vermont and Canada before taking charge of the Tamworth management district.

Study Louisiana Licensing

Licensing of foresters in Louisiana is being studied by the North Louisiana Group of Foresters. A committee of the group has drawn up a Proposed Act to License Foresters in the State of Louisiana. This is patterned after the Georgia act, and includes provisions taken from a Louisiana act of 1950 for the registration of engineers.

Your Saw's a Sweetheart with OREGON Chipper CHAIN

Thousands of owners of all makes of saws have found that genuine OREGON Chipper Chain steps up performance because it cuts fast, stands up longer, is easily filed in half the usual time. Regardless of the size and type of timber you work in, hard-chromed OREGON Chipper Chain makes your saw a better tool.

SEE YOUR DEALER OR WRITE FACTORY FOR DETAILS

Copyright 1953 by Oregon Saw Chain Corp.

OREGON Saw Chain Corp.
SAW CHAIN SPECIALISTS
8816 S. E. 17th Ave. Portland 2, Ore.

Use EAGLE Tree Markers

Eagle Duo-hydraulic Tree Marking Guns make tree marking easy, positive and fast. Just aim the nozzle at the tree and press the trigger lever. That's all! Paint sprays freely. Simple to take apart and clean. No clogging parts. Guaranteed against leakage. ¾, 1 and 2 pint capacities.

FOR SPECIAL NUMBERING JOBS USE THE EAGLE SUPER #66

All brass piston type gun. Tree tested on 40,000 Lake States Region trees. Takes undiluted but strained outside paint. Won't leak.

Order from your Supply Dealer or write for further information.

EAGLE MANUFACTURING COMPANY Wellsburg, West Va.

THE FORESTRY DEPARTMENT of the University of New Hampshire recently conducted a 5 day course in Aerial Photogrammetry for foresters. Fourteen foresters from New Hampshire, Vermont, Maine and New York representing pulp and paper companies, state forest services, consulting firms and county forestry organizations attended. The course was taught by Dr. Bertram Husch, Associate Professor of Forestry, Department of Forestry of the University of New Hampshire. Plans are being made by the department to offer similar short courses in other specialized fields of interest to men in the profession.

Measurement of Tree Growth May Determine Spittlebug Injury

Prediction of Saratoga spittlebug outbreaks in the Lake States may be possible through measurement of tree growth in red pine, according to a report made to the American Association of Economic Entomologists December 16 by Dan Benjamin of the Milwaukee Forest Insect Laboratory.

Light infestations of the spittlebug —a current enemy of pine plantations in the Lake States—cause little or no apparent damage to the tree, according to Benjamin, but changes in tree form occur. If these changes can be observed early enough, the insects may be controlled before they build up into a heavy infestation that will kill the trees.

The new approach to the old problem of detecting insect outbreaks before they become serious involves comparing measurements of the height growth of the tree trunk each year to measurements of that year's branch growth. Normal uninjured trees show a ratio in these measurements that is common to the tree in all soil types and from season to season. Trees lightly infested by Saratoga spittlebugs deviate from the normal pattern of growth.

Examinations in north central Michigan, begun in 1951, seem to bear out the theory. They revealed a typical growth pattern in normal trees and further showed that when damaged trees were sprayed to control the spittlebugs, the growth pattern was nearer normal the following season.

21,500 Acres in Michigan To Go Under Reserve Act

A total of 21,500 acres of upper peninsula private forests will be placed under the forest reserve act starting with 1953, the conservation department of the State of Michigan reports.

The act provides for a form of tax postponement on lands that will later yield timber products. The tax is collected when the timber is harvested.

The 21,500 acres requested for reserve next year is unusually high, generally less than 10,000 acres are asked, but this year one group asked for reserve of 15,000 acres of cut-over land in Bergland township, Ontonagon county.

ALTIMETER
"HAGA"

Aim at the tree top and read the height direct from the scale. Errors eliminated.

Easy to handle. Most accurate and quick results. Ask for leaflet. **Price $24.—**

Leathercase with shoulder strap. $4.—
Rangefinder available. $14.—

Delivered . . . C.O.D. from New York warehouse or cheque with order.

Sole Agent: WM. WOLFF
4 Lonsdale Close, Orchard Drive, Edgware, (Middx), ENGLAND

A Zoologist Writes: "Every imaginable remedy tried for protection against ticks and chiggers; only Ticks-Off" passed the acid test."

STOP INSECT BITES!
PREVENT DISEASE & INFECTION!

TICKS-OFF

More Than A Repellent

SAFE! FAST! Keeps away Chiggers, Ticks, Mosquitoes, Flies. A few second spray protects you all day! Ask your *dealer*.

5 Oz. & 12 Oz. Bombs

WHITMIRE'S, ST. LOUIS 10, MO.

KEEN MINDS USE SHARP TOOLS

SHARPEN

YOUR KNIFE, AXE, SICKLE Without Cutting Your Fingers

Send 10c for 24-page illustrated booklet

How to Sharpen "SAFELY"

THE VICTOR TOOL CO.
OLEY 3164 PENNA.

BOOKS FROM

McGraw-Hill

FOREST POLICY

By COLONEL W. B. GREELEY, Vice-President, West Coast Lumberman's Assn. *American Forestry Series.* Ready in July

An excellent study of the best known American foresters of forest policy in the United States and abroad. The policies of eighteen foreign countries as well as our own history are discussed as background to an understanding of forces now working out an American forest policy by a democratic process of experience and cooperation.

FOREST VALUATION

By HERMAN H. CHAPMAN, and WALTER H. MEYER, Yale School of Forestry. *The American Forestry Series.* 521 pages, $6.50

Placing special emphasis on basic economic principles underlying the structure of forest valuation, this text is outstanding for its wide coverage. Considerable attention is given to discount, market values, and the analysis of grade composition and the value of standing timber. Several sections are devoted to such subjects as the organization of private enterprise and the source and origin of economic values.

FOREST MENSURATION

By HERMAN H. CHAPMAN and WALTER H. MEYER. *The American Forestry Series.* 522 pages, $6.00

A practical text for forestry students and a field manual for foresters, dealing with the measurements of trees and timber, and of harvested lumber and other products. The material is entirely up to date and the authors deal first with forest products, tracing from cause to effect; the next step is to study the individual logs or bolts; then a combination of their contents into volume tables for average trees by diameter, height, and form classes.

Send for copies on approval

McGRAW-HILL BOOK CO.
330 West 42nd St.
New York 36, N. Y.

Inaugural Lumber Re-sold

The nation's taxpayers and Washington, D. C., businessmen were saved more than $30,000 by the re-sale of all lumber used to construct stands for President Eisenhower's Inauguration, the National Lumber Manufacturers Association has reported.

James R. Skinker, whose construction company, Skinker and Garrett, has built all the Inaugural stands since 1920, said his firm had no trouble reselling the lumber because "it was still in top condition after all the pounding from tens of thousands of Inaugural spectators."

Construction of the 1953 Inaugural stands, which used about one million board feet of lumber, was paid for by the federal government and a special Inaugural Committee. The latter was supported by Washington businessmen and the sale of tickets for Inaugural parade seats and the Inaugural balls.

The major cost item in construction of the stands was about $135,000 for lumber. Approximately one-fourth of this original cost, or more than $30,000, was recovered by re-sale of the lumber to a Washington lumber yard.

Most of the lumber will be re-used in home construction. A small part of the wood platform from which Mr. Eisenhower took the oath of office has been made into special gavels for Vice President Nixon and House Speaker Martin.

Two Names Added to "Official" List of Trees

A variety of pine in Florida and a species of ash in Arizona, have now been recognized and named by the Forest Service as distinct tree types, the U. S. Department of Agriculture has announced. Under their new names, both trees have been added to the official Forest Service list of all trees in the United States and Alaska.

The pine, long known to foresters as a variation of slash pine, has been named South Florida slash pine. It has a hard durable wood generally sold as longleaf yellow pine lumber and is not used for turpentining. Occupying about 1,750,000 acres of commercial forest land south of Lake Okeechobee in southern Florida, it is found also on the lower Florida Keys and in strips northward along both coasts of the State.

Field studies distinguishing this pine from slash pine and Caribbean pine were made by Elbert L. Little, Jr., of the Forest Service, Washington, D. C., and Keith W. Dorman, staff specialist of the Southeastern Forest Experiment Station at Asheville, N. C. and the results published in the December 1952 issue of the JOURNAL.

The new ash species has been named Goodding ash by Dr. Little in honor of Leslie N. Goodding, Arizona botanist, who first discovered the species while employed by the U. S. Department of Agriculture. It is a small tree or large shrub about 20 feet high, with small, usually green leaves.

The Goodding ash is rare, occurring in Arizona only in a rugged canyon within the Coronado National Forest, about 15 miles northwest of Nogales on the Mexican border. It has been found also in northeastern Sonora, Mexico, about 70 miles south of the international boundary.

T.V.A. to Survey Private Forests

A survey of privately owned forests in the Tennessee Valley has been started by T.V.A. foresters, Willis M. Baker, Director of T.V.A.'s Division of Forestry Relations, has announced. The survey is meant to provide information on the status of forest management by types of ownership and size of holding, and will indicate the kinds of assistance owners need from public forestry agencies.

Crews working out of Asheville, North Carolina, Wilson Dam, Alabama, and Norris, Bristol, Chattanooga, and Paris, Tennessee, will examine some 300 sample forest areas and talk with the timberland owners within each area. Field work will be completed early in May. Published results will be available to all forestry agencies in the Valley some time in August.

Evaluation of forest management practices will be based on the owner's interest in timber growing, how much planning he has done to guarantee continuous production, how his logging methods affect watershed protection, how well he has protected his land from fire, grazing, insects, and disease, how successful his reforestation efforts have been, and whether or not he has provided such improvements as roads and trails.

In 1945 the U. S. Forest Service made a nation-wide survey of forest lands. It reported 64 percent of the timber cutting as being destructive of the resource. Only 8 percent was rated as good or better.

Forest Statistics of Indiana

Indiana has 11.0 billion board feet of saw timber, 99 percent of which is in hardwood species, according to Forest Survey Release No. 15, entitled "Forest Statistics of Indiana" recently released by the U. S. Department of Agriculture.

The report was compiled by the Central States Forest Experiment Station of the Forest Service located in Columbus, Ohio. Cooperating in the survey were the Division of Forestry of the Indiana Department of Conservation and Purdue University.

The total sawlog volume shown in the present survey is about 78 percent greater than the amount estimated in the 1945 reappraisal report. This difference is attributed to the greater accuracy of the recent survey rather than to change in the forest resource during the past few years.

The report includes a brief analysis of the forest situation and tables on forest area, timber volumes, timber growth, and the amount of timber cut. Indiana's forest land, according to the report, covers 4.1 million acres, or 18 percent of the total land area. These lands now support an average of 2,722 board feet of saw timber per acre.

The survey further points out that Indiana forests are growing about 551 million board feet each year as compared to an annual cut of about 254 million board feet. While the net growth of Indiana forests is exceeding annual cut, the excess growth is chiefly in low-quality trees. The cutting of high-quality hardwood trees exceeds growth of high-quality timber by about 38 percent. Foresters estimate the average volume and the annual growth could be at least doubled if the forests were well managed.

The Indiana survey is a part of the nation-wide survey conducted by the Forest Experiment Stations of the Forest Service. Copies of the report on Indiana are available from the Central States Forest Experiment Station, 111 Old Federal Building, Columbus 15, Ohio.

S. C. Tree-Planting Demonstrations

Nineteen schools and three churches in 19 South Carolina counties have completed planting 36,000 pine seedlings this season according to W. J. Barker, leader, Clemson Forestry Extension Work. Six of these plantings, using 18,000 seedlings, were made by colored schools.

Seaboard Airline Forestry Demonstration

More than 550 persons were in attendance at a forestry demonstration held on the John A. Varnedoe property near Claxton, Ga., on Wednesday, January 28, under the sponsorship of the Industrial Department of the Seaboard Air Line Railroad Company.

WATER when and where you want it!
with HARODIKES
Portable Canvas Water Tanks
THE ECONOMICAL AND EFFICIENT WAY TO CARRY AND STORE WATER.
ON THE JOB - ON THE SPOT
KEEPING AMERICA GREEN
EXCLUSIVE FEATURES
• Self Supporting • Easily Back-packed
• Ideal for Relay Pumping • Easily Transported
Available in 150 & 300 gallon sizes
A WATER SUPPLY AT THE SCENE OF THE FIRE
Write TODAY for Full Information and Price List
HARODIKES INCORPORATED
NORTH DIGHTON, MASSACHUSETTS

EVERGREENS
FOR
FOREST PLANTING OR ORNAMENTALS
For 88 years we have been growers and propagators of evergreen seedlings and transplants, and are in a position to supply you with quality planting stock in small or large amounts, at reasonable prices. Write for complete trade list.
EVERGREEN NURSERY CO.
Established 1864 Sturgeon Bay, Wisconsin

RUGGED AS A POULAN

POULAN chain saws are job-tested to give you more continuous hours of operation than any chain saw built. Stay on the job where they belong . . . not in the shop.

Poulan chain saws get more work done in less time and at lower cost. RUGGED . . . and just right for any job in the field!

Bow attachments: 18 to 33 inches

Straight guides: 24 to 74 inches.

Write for descriptive folder and name of nearest Poulan dealer.

POULAN CHAIN SAWS
P. O. BOX 3605 SHREVEPORT, LOUISIANA

Consulting Foresters

Professional Services Offered by
Members of the Society of American Foresters

Consultant—Manager for Operating Firms

Hardwood Bottomlands and MISSISSIPPI DELTA

GULF STATES Shortleaf, Slash & Longleaf Pine

KEITH CRANSTON, *Consulting Forester*

Commercial Cruising Services
KEITH CRANSTON and Associates, Leland, Mississippi
Woodsland Managers • Timber Estimators
Forest Inventories • Growth Studies
Reconnaissance • Appraisals

A TIMBER SERVICE FOR THE SOUTH

GEORGE BANZHAF & COMPANY

622 North Water Street MILWAUKEE 2 BRoadway 6-2062

Consultants to the Forest Industries

FOREST APPRAISALS FOREST TAXATION
GROWTH AND MANAGEMENT PLANS

FRANK J. LEMIEUX
Consulting Forester
25 Years' Experience in North and South America
833 WHITNEY BLDG., NEW ORLEANS 12, LA.

Reforestation Arboriculture

S. GAYLEY ATKINSON
Consulting Forester
Huntingdon Road
Huntingdon Valley, Pa.

SAMUEL A. NEWMAN
Forest Engineer
Timber Cruiser
P. O. Box 156
Everett, Washington

Complete Professional Service

WILLIAM A. EASTMAN, Jr.
Consulting Forester
Telephone SEneca 2814
410 J. Green Bldg. SEATTLE 1, WASH.

FOREST PROPERTY
Estimates—Appraisals—Management
Prentiss & Carlisle Co., Inc.
107 Court Street Bangor, Maine

POND & MOYER CO., INC.
Consulting Foresters
Estimates—Appraisals—Surveys
Machine Tree Planting Service
107 HOMESTEAD RD., ITHACA, N. Y.

Timber Cruising Forest Engineering

ROBERT E. KLEINER
Forester
2520 I Street Phone
Arcata, Calif. 771-W

T. F. Grayson & Company
Consulting Foresters
Serving Small and Large Timber Tract Owners
Prescott Arkansas

Ellis D. Sikes, vocational agriculture instructor of Claxton, served as general program chairman.

Clark Gaines, Executive Secretary of the Georgia Department of Commerce, was the featured speaker. He outlined the importance of Georgia's forests to her economy and stated that Georgia had more acreage under protection than any other Southeastern state.

Mr. T. G. Walters, State Supervisor of Vocational Education, gave the address of welcome with the response being given by the Evans County Agent, James Brannen. Also speaking during the morning session were J. N. Baker, District Supervisor of Vocational Agriculture, who outlined the tangible contributions being made by the Future Farmers in Georgia in behalf of forestry betterment, and Walter Stone, District Forester of the Georgia Forestry Commission, Statesboro, Ga.

The actual woods demonstration included such phases as timber stand improvement, control of undesirable hardwoods by use of various chemicals, bark chipping and acid stimulation.

R.R.C.C. Names Utilization Committee

A new utilization committee has been added to the Redwood Region Conservation Council, of San Francisco, Calif., according to Robert W. Matthews, Eureka, R.R.C.C. President. The committee will study wood utilization problems in the region and strive to develop new markets for waste products.

T. T. Stoleson, general manager of Mutual Plywood Corporation, Eureka, has been named chairman.

Other members are Dewey Lung, Humboldt Plywood Corporation, Howard Libbey, Arcata Redwood Company, Marvin Krei, chairman, Humboldt County Board of Supervisors, W. D. Pine, Humboldt County Farm Advisor, E. T. F. Wohlenberg, Masonite Corporation, Herman Matisoff, Arcata Plywood Corporation, C. L. Hokonson, Simpson Logging Company, Ralph DeMoisy, M & M Woodworking Company Timber Division, and Clay Brown, Clay Brown & Company.

Southern Agricultural Workers Forestry Section Meets

The 5th anniversary meeting of the Asociation of Southern Agricultural Workers was held in New Orleans February 9-11.

New officers of the Forestry Section were elected as follows:

As chairman, J. S. Therrell of Mississippi State College succeeded Wilbur DeVall of Alabama Polytechnic Institute.

G. N. Bishop of the University of Georgia was advanced from secretary-treasurer to vice chairman.

A. Bigler Crow of Louisiana State University was elected secretary-treasurer.

The next meeting of the Association will be held in Dallas, Texas in February 1954.

Cuppett Appointed W. Va. Assistant State Forester

Donald G. Cuppett has been appointed Assistant State Forester in charge of Forest Management according to an announcement by Carl J. Johnson, Conservation Commission Director. Cuppett will replace Harry Lee Baker whose resignation became effective February 17.

The Assistant State Forester supervises programs including forest improvement work on private woodlands, Oak Wilt and Blister Rust control and assists in timber management work on the state forests. He also assists the West Virginia Forest Council in its Tree Farm Program.

Range Research Chief Named

Dr. David F. Costello has been appointed Chief of Range Research at the Pacific Northwest Forest and Range Experiment Station. He succeeds Joseph F. Pechanec who recently moved to Washington, D. C. as national range research chief for the Forest Service.

In his new position, Dr. Costello will supervise range management and reseeding studies in Oregon and Washington. He moves to Portland from the Rocky Mountain Forest and Range Experiment Station in Fort Collins, Colorado where since 1937 he has been in charge of range research for the Rocky Mountain Region.

Dr. Costello has worked extensively on range research in the West since his appointment by the Forest Service in 1934 at Ogden, Utah. Following a Washington, D. C. assignment in 1935, he transferred to the Rocky Mountain Station where he directed the Western Range Survey which inventoried more than 18 million acres of range land.

Air Operations Officer Named

Monte K. Pierce has been appointed air operations officer for the Pacific Northwest region of the U. S. Forest Service. He fills the position left vacant by the retirement last fall of Lawrence J. Sohler.

In charge of forest service air activities in Oregon and most of Washington, Pierce will provide technical assistance on aerial matters for the 19 national forests in the region and the Pacific Northwest Forest and Range Experiment Station.

His duties will include inspection and approval of contract pilots for fire prevention and control work, supervision of maintenance for forest service aircraft, and assistance to smokejumper projects at Illinois Valley airport near Cave Junction, Oregon and Intercity airport near Winthrop, Washington. He also will act as technical consultant in seeding of range areas and forested lands on the national forests and in aerial surveys of blowdown and insect-killed timber.

Forest Supervisor Retires

Carl B. Neal, with 40 years of public service to his credit, retired February 28 as Olympic National Forest supervisor.

A native of Nebraska, Neal's entire career has been pursued in the Pacific Northwest. Following appointment to a Forest Service position in 1913, he worked as resource manager and administrator on several Oregon forests and in the Portland regional office until assigned as supervisor of the Olympic forest in 1939.

After serving from 1913 to 1922 in various positions on the Oregon (now Mt. Hood) and Malheur national forests, Neal was promoted to supervisor of the Umpqua forest. In 1930 he transferred to the Deschutes National Forest as supervisor and in 1937 was appointed to the operation division in the regional office.

A member of the S.A.F., Neal received a B.A. degree from the University of Oregon in 1910 and a master of forestry degree from Yale Forest School in 1913.

New Forestry Firm

C. H. Schaeffer, Forester, Tuscaloosa, Alabama has announced the organization of a new firm called Deep South Consulting Foresters to cover

Pioneer Manufacturers of

VHF-FM *Radio Equipment*

COMCO WAS FIRST --

- Commercial equipment for 152-162 MC band.
- Complete 152-162 MC police system.
- To manufacture Power Supply Transmitter & Receiver on separate strips.
- Complete Railroad VHF-FM system.
- To use selenium rectifiers in mobile equipment.
- Unit that could be connected to battery regardless of polarity.
- Complete mobile unit for under-dash mount.
- VHF-AM mobile unit with FM type construction.

COMCO manufactures radio communications equipment EXCLUSIVELY.

COMCO

Manufacturers of Radio and Electronic Equipment

COMMUNICATIONS COMPANY, INC

CORAL GABLES 34 FLORIDA

COMPLETE INVENTORY CRUISING SCALE

Hypsometer
Biltmore Scale
Rigid When Open
Flexible 6-foot Steel Tape
Handy Chrome-plated Case 1¾" Dia.

$3.00 EACH

IMMEDIATE DELIVERY

CARL W. GETZ, *President*

KURFEW, INC.

Lansdale, Pa.

Calder's Forest Road

ENGINEERING TABLES

Ready figured, for professional and axe handle engineers. Great time saver. The condensed experience of 30 years in the woods. Unbeatable for laying out roads. Absolutely weatherproof. Will send on approval (in U. S. only) to foresters and engineers for two weeks trial. Ask for it.

LESTER E. CALDER and DOUGLAS G. CALDER
1828 Hilyard St. Eugene, Oregon

GROW TREES

FOR XMAS TREES AND FORESTRY
Fir, Pine and Spruce in Variety
Seedlings and Transplants
Write for Price List

Suncrest Evergreen Nurseries
P. O. Box. 643, Johnstown, Pa.

Alabama particularly, as well as the Carolinas, Georgia, Florida and Mississippi.

They plan to provide timber cruising service, timber and land management for resident and non-resident owners, estates and trusts, make sustained yield studies and plans and act as forest investment counselors.

The selective marking of timber and the planting of forest trees will form a large part of their work.

Mr. Schaeffer was formerly Assistant State Forester of Alabama, Florida and South Carolina. He was Associate State Forester of South Carolina and the first Director of State Parks for the State of Florida. More recently he has been in the ash and hickory handle business in South Carolina and connected with a lumber business in Alabama. He is a Major of Marines and a member of the S.A.F.

Moore Enters Consultant Field

Al W. Moore, Hillsboro, Oregon, has entered the consultant field as a specialist in reforestation and animal influences.

Mr. Moore received a Certificate of Merit last June on retirement from the U. S. Fish and Wildlife Service after 35 years. His work has received wide attention during the last few years, since it was largely through his efforts that direct seeding of forest lands was developed in its present form. He developed a formula for rodent control bait and a method of sampling rodent populations in areas to be reforested.

Conn. Watershed Council Selects Executive Director

Elmer R. Foster has been appointed executive director of the Connecticut River Watershed Council, an organization dedicated to improvement of the watershed area which covers 11,000 square miles from the Canadian border to Long Island Sound, it has been announced by Nathan Tufts, president of the Council.

Foster will direct the Council's activities in four states—New Hampshire, Vermont, Massachusetts and Connecticut. Since 1945 he has been forester for the town of Russell. He studied at the New York State Ranger School and the Pennsylvania State School of Forestry. He was associated during the 1930's with the Civilian Conservation Corps and the U. S. Forest Service.

A.F.P.I. Staff Changes

Edward L. De Motte, former Gulf States district manager for American Forest Products Industries, has succeeded C. Edward Stout, southeastern district manager, with headquarters at 1029 Grant Building, Atlanta, Ga.

Mr. Stout is being transferred to the Washington office of A.F.P.I. where he will become administrative assistant.

Mr. De Motte, former co-publisher and associate editor of the *Alabama Lumberman*, is a native of Montgomery, Alabama, and a graduate of the University of Alabama.

The new southeastern district manager's territory will cover Georgia, Florida, and Alabama. The Gulf States managership has been assumed by Franklin Bradford, former Texas newspaperman. Mr. Bradford, with headquarters in New Orleans, will cover A.F.P.I. activities in Louisiana, Mississippi, and Texas.

MEASURING DEVICES FOR LUMBERMEN

• BOARD RULES • LOG RULES • STEEL TAPES
• TREE TAPES • LOG CALIPERS • LUMBER GAGES
• CRUISER STICKS • FOLDING LOG RULES

For nearly three generations lumbermen and foresters the world over have relied on Lufkin for top quality measuring devices. Today the industry recognizes Lufkin products as The Standard of Accuracy for its measuring needs.

For your free copy of the 12-page booklet, *Lufkin Board and Log Rules*, send the coupon below.

BUY LUFKIN TAPES • RULES • PRECISION TOOLS FROM YOUR SUPPLY HOUSE

THE LUFKIN RULE CO., SAGINAW, MICHIGAN
132-138 Lafayette St., New York, N.Y. • Barrie, Ontario 225

FREE BOOKLET

THE LUFKIN RULE CO., Dept. JF, SAGINAW, MICHIGAN

Gentlemen: Please send me your free 12-page booklet on Lufkin Board and Log Rules.

NAME _____

ADDRESS _____

CITY _____ STATE _____

Use the McCULLOCH fast-cutting light-weight chain saw for

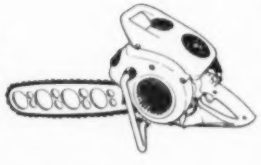
Cutting - Thinning - Logging

GREATER PRODUCTION

MODEL 7-55: Seven horsepower, weighs 55 pounds, with 20" chain and blade. Costs from $450.00*. F.O.B. Los Angeles

MODEL 3-25: Three horsepower, 25 pounds. New HH Chain. Three sizes available. Costs from $285.00*. F.O.B. Los Angeles

*State Sales Tax not included.



CALL or WRITE

Joe H. Brady & Associates

1921 Powell Avenue, South

Birmingham, Alabama

Marinus Westveld Retires

Marinus Westveld, well-known silviculturist, retired in December 1952 after 40 years of service. Mr. Westveld has been a Member of the Society of American Foresters since 1919. At the time of his retirement he was assigned to the Division of Forest Management, Northeastern Forest Experiment Station, Upper Darby, Pa.

Mr. Westveld was born in Grand Rapids, Mich. on July 2, 1889. After graduating from Michigan Agricultural College in 1913 he entered the Forest Service in July of that year. During the next two years he worked on various western national forests. In 1915-1916, on leave from the Forest Service, he did graduate work at Yale Forestry School, taking the M.F. degree in June 1916.

Science Fellowships for '53-'54 Offered by College of Forestry

Graduate students of the physical and biological sciences have been invited to apply for fellowships worth $1,250 to $1,700 offered for 1953-54 by State University of New York College of Forestry at Syracuse. Applicants may choose among 15 special study areas including the college's newly expanded programs in forest economics and polymer chemistry, according to the announcement by Dean Hardy L. Shirley.

The fellowships and graduate scholarships are being awarded during March, April and May. Applications were closed in mid-March. Both are for a nine- or a twelve-month period.

Besides 25 established by the College, five other fellowships with industrial or other sponsorship will be awarded by the forestry college. These will go to specially qualified students for work on assigned projects.

Dr. Shirley said that fellows may pursue studies leading to the M.F., M.S., or Ph.D. degrees. The college program of graduate study and research currently has 89 students and a full-time research staff of 30 persons.

Specialized studies may be made in forest botany, entomology, management, administration, zoology, photogrammetry, mensuration, or economics; wildlife management, silviculture, wood technology, landscape architecture, forest products manufacture and utilization, pulp and paper technology, or cellulose and polymer chemistry.

Also to be awarded are special teaching and research assistantships paying an hourly wage, and several tuition scholarships for students from outside New York State. Fellows assist in teaching and research work of the college for no more than 15 hours a week.

Michigan State College Celebrates 50 Years of Forestry

On May 22 and 23, 1953, Michigan State College will commemorate its 50th year in forestry. Among the first of the nation's colleges and universities to offer professional training in forestry, Michigan State College established a Department of Forestry and offered a Bachelor's degree in the field starting in 1902. Prior to 1902 limited training was offered in the Department of Botany and Forestry.

Included in the Golden Anniversary celebration are scheduled an Alumni Association meeting, a speaking program, a banquet and tours of the campus and college's Kellogg Forest.

★ ★ ★

CONSTRUCTION of new farm buildings and maintenance and repair of old ones consumes over four million board feet of lumber per year.

Forestry Courses at A. and T. College of N. C.

The Agricultural and Technical College at Greensboro, North Carolina, is now offering three courses in forestry. Administered in the School of Agriculture, these courses are open to Juniors and Seniors on an elective basis.

The establishment of forestry courses at this college of over 3,000 students attests to the growing recognition of the great importance of for-

HOW MUCH SHOULD YOU SPEND FOR A BINOCULAR

Zephyr-Light 7X,35mm Binocular Balcoted Optics $155, plus tax

A close-up view, sharp and bright . . . *and a lifetime of service* . . . can be provided only by a binocular built as a true precision optical instrument. The Bausch & Lomb binocular represents the design and construction necessary for adequate optical performance and sturdy serviceability. No glass which offers less is a bargain at any price. Before you buy any binocular read our 32-page booklet "Binoculars and How to Choose Them." For a free copy write Bausch & Lomb Optical Co., 10816 Lomb Park, Rochester 2, N. Y.

BAUSCH & LOMB Binoculars

Code of Ethics

The Code of Ethics for the forestry profession has been appropriately printed for framing. Legibly and attractively printed in two colors, black and green, on heavy paper, 13" x 20." Any member may obtain for 25 cents to cover cost of printing, postage, and mailing tube. Order today.

SOCIETY OF AMERICAN FORESTERS
Mills Building, Washington 6, D. C.

MUSSER TREES are GROWING IN ALL 48 STATES!

20 Million TREES a year!

Every year our large teams of hard-working MUSSER tree planters start more than 20 million more trees on the way to hardy, healthy and successful treehood: Seedlings for Forest and Christmas Tree plantings; Transplants for Conservationists, Timber Operators and Farmers. MUSSER customers KNOW they will receive trees that have the RIGHT START. Further, we offer about the widest selection of Quality plus Volume to be found in the world today. You will profit from the economies our huge volume makes possible.

At right are a few of our low quantity prices:

Also shade and hardwood seedlings. Write today for Christmas Tree Growers' Guide and complete wholesale stock list; or tell us your requirements

SPECIAL SCOTCH PINE
2 yr. seedlings 4-8" $35. per 1000
NORWAY SPRUCE (MUSSER Special)
2 yr. seedlings 5-10" $35. per 1000
WHITE PINE
2 yr. seedlings 2-6" $20. per 1000
DOUGLAS FIR
3 yr. seedlings 6-12" $45. per 1000

MUSSER FORESTS, INC.
BOX 26D INDIANA, PA.

Forestry Employment

S.A.F. members are privileged to insert one 60-word advertisement in this column without charge. Forest industries desiring to employ foresters may insert advertisements at the rate of $4 per column inch. Copy must be received by the end of this month for an advertisement to appear in the issue after next.

Obviously, the Society cannot assume responsibility beyond making it possible for prospective employee and employer to enter into negotiations.

Positions Available

Temporary seasonal positions as pine delineators (mapping, sampling, aerial photograph interpretation, etc.) in the pine region of the Sierra Nevada mountains of California and Oregon, will be filled commencing April 15. Training given after reporting. GS-5 grade. No examination required. Dependents cannot be accommodated.
Blister Rust Control Office, U. S. Dept. Agric., 1515 Clay Street, 6th Floor, Oakland 12, Calif.

Forester with interest in utilization to start with and work into a position as builder of a holding and sales organization for products which are produced under management by this organization in New England. Ability a greater prerequisite than experience.
N. E. Forest Industries, Inc., 3 N. State St., Concord, N. H.

The city of Pontiac, Michigan is taking applications for City Forester in combined parks and recreation department. Forestry degree required: tree care and park maintenance experience desirable. Salary $3,978-$4,290 annually; liberal vacation, sick leave, and retirement benefits. Application available from Personnel Director, City of Pontiac, City Hall, Pontiac 14, Michigan.

Positions Wanted

Forestry or related job in Northeast. Experience in private and government forestry in South and Northeast both in fire control and timber management, also some experience as logger. M.F. degree. Good engineering background. Married, two children. Veteran.
Box L, Journal of Forestry, Mills Building, Washington 6, D. C.

Graduate forester, 26, 2½ years of experience in eastern Oregon and northeast U. S., including timber cruising, surveying, land and timber acquisition, logging, and forest management. Graduate of National Hardwood Lumber Association Inspection Training School, Memphis, Tenn. Presently employed as assistant forester in eastern Oregon. Seeks position with a future.
Box M, Journal of Forestry, Mills Building, Washington 6, D. C.

Forester, 38, B.S.F., with graduate research and specialized training in surveying and mapping. 13 years with National Park Service, U. S. Army (officer), and Forest Service. Desire change to private forestry in cruising, surveying, appraisals, or technical assistance in timber management or land surveys.
Box O, Journal of Forestry, Mills Building, Washington 6, D. C.

Forester, age 48, married—B.S. in Forestry, University of Maine, 1927. 12 years government service, two being spent in close association with pulpwood industry throughout United States, east of Great Plains. 14 years with industry, currently employed as Woods and Sawmill Manager of paper mill and sawmill in northeast. Seeks position of greater responsibility. Available for interview.
Box Q, Journal of Forestry, Mills Building, Washington 6, D. C.

Forest surveyor. College and technical education, 5½ years. Have 18 years total experience in forestry supervision work; survey party chief on major construction jobs in the East. Registered land surveyor New York State and New Mexico. Prefer employment South or Southwest.
Box R, Journal of Forestry, Mills Building, Washington 6, D. C.

Forest manager, now intensively managing corporation-owned forest in Southeast. Accomplishments in present position widely known and are best recommendation. 18 years experience in southeastern states with only two employers. Married, one child. B.S.F. 1928. Desires change to other management, public relations, or sales work.
Box S, Journal of Forestry, Mills Building, Washington 6, D. C.

Forester, B.S.F., Colorado A & M, 1942 desires position in Northwest in wood preserving or purchase and inspection of forest products. Six years' experience with nationally known wood preserving companies in all phases of plant operation and procurement.
Box T, Journal of Forestry, Mills Building, Washington 6, D. C.

Forest engineer retiring from active field work desires the management of a private or club game preserve in a timbered area. Has had general North American experience, especially in the North Woods, State of Maine, Blue Ridge, and the Pacific Coast. Has specialized in pulpwood and log production, and woods engineering.
Box U, Journal of Forestry, Mills Building, Washington 6, D. C.

Graduate forester, 26, married wants to learn business or administrative field of forestry with organization in or around New York City. Willing to acquire additional college education, at own expense, to qualify. Employed in forest management in Northwest. Returning East, early summer.
Box V, Journal of Forestry, Mills Building, Washington 6, D. C.

Graduate forester, veteran, 34, married, 3 children, desires change for opportunity to advance. Five years' experience state forestry work, some experience southern logging and lumbering. Employed as district forester.
Box W, Journal of Forestry, Mills Building, Washington 6, D. C.

Forester 28, B.S.F. University of Michigan, married, one child, desires position with lumber or paper company in East or Lake States. Four years forest management and timber marketing experience; also fire control with U. S. Forest Service.
Box X, Journal of Forestry, Mills Building, Washington 6, D. C.

ests and forestry to the entire economy of the South, and especially to the Negro farmers of the region.

An understanding of the fundamental principles of forestry is becoming generally accepted as essential to sound farm management. Forestry was established at A. and T. College to provide farm management, agricultural education, and other agricultural majors an opportunity to acquire a basic knowledge of these principles.

Technical forestry literature is rapidly being added to the College library and forestry equipment and supplies have been purchased for field laboratory sessions. Field exercises are conducted on the college woodlot and on the woodlots of local farmers. An insight into the results of silvicultural and management research activities is provided by visits to the nearby Duke Forest.

During the 1952-53 school year forestry instruction is under the supervision of a visiting professor from the School of Forestry faculty of Duke University, Dr. C. H. Stoltenberg. Selection of a permanent, full-time professor in forestry has not yet been made by the A. and T. College Administration. Interested individuals who consider themselves well-qualified for such a position may obtain further information by writing to Dr. W. E. Reed, Dean of the School of Agriculture, or to Dr. F. D. Bluford, President of the College.

A. and T. College is the third all-Negro institution to offer college instruction in forestry. Forestry courses have previously been given at Alcorn A. and M. College of Mississippi (1950-51) and Tuskegee Institute of Alabama (1951-present).

Texas Fellowships Offered

The Texas Forest Service, of the Texas A. & M. College System, announces the availability of two research fellowships effective September 1, 1953. The fellowships will be granted to candidates for the degree of Doctor of Philosophy in the field of forest genetics, forest physiology or wood technology (anatomy). The amount of each fellowship is $1,680 a year on a 12 month basis.

Candidates holding a master's degree in a plant science are preferred. The candidates may major in either the Departments of Biology, Plant Physiology or Genetics of A. & M. College of Texas, College Station, Texas.

The research fellowships are part of the Texas Forest Service's forest tree improvement program under the direction of Dr. Bruce Zobel of the Research & Education Department. The Texas Forest Service will provide office, laboratory, greenhouse and lathe house space for the recipients of the fellowships. Furnished and unfurnished apartments owned by the College are available at a nominal rent to accommodate married students.

For further information regarding the fellowships, inquiries should be addressed to Dr. A. D. Folweiler, director, Texas Forest Service, College Station. For additional information pertaining to academic matters, inquiries should be addressed to Dr. Ide P. Trotter, dean, Graduate School, A. & M. College of Texas, College Station, Texas.

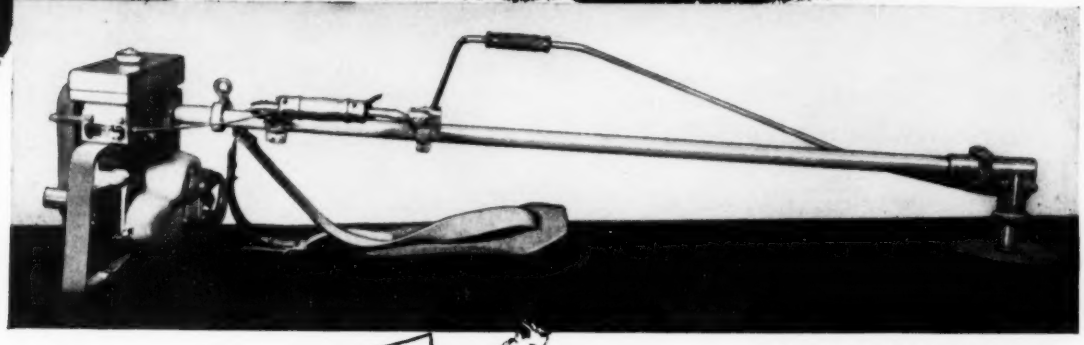
BRUSHMASTER®

CUTS COSTS!

BRUSHCUTTING MACHINE HAILED BY INDUSTRY!

"According to my calculations, the two BRUSHMASTERS would pay for themselves in twenty-nine (29) working days."

SOUTHERN CANADA POWER CO.



BRUSHMASTER

DIRECT FACTORY DEALERSHIPS AVAILABLE!

- **Choice territories now open**
- **Complete, free promotion plan**
- **Free inquiry referral plan.**

Unusual opportunity! Sales of this revolutionary brush cutter practically assured by the complete sales promotion plan!

WRITE TODAY on your own letterhead for complete details of procuring a valuable Brushmaster Factory Dealership!

ONE MAN WITH BRUSHMASTER CLEARS BRUSH Cheaper, Faster Than 6 Hand Cutters

- **Lightweight (35 lbs.) . . . easily operated!**
- **Designed by arboriculture and forestry experts!**
- **Clears all undergrowth . . . even sapling to 4" diameter!**
- **Dependable, rugged . . . free from vibration!**

This amazing new commercial brushcutting machine is the ONE LOGICAL METHOD of maintaining right-of-way clearance! Brambles, vines, bush, brush, briars . . . all undergrowth is quickly, easily, safely cleared by Brushmaster . . . and AT LESS COST! Exhaustively field tested under grueling conditions, Brushmaster is now hailed by hundreds of enthusiastic users!

Manufactured and sold in Canada by
H. & R. Arms Co., Ltd., Drummondville, Quebec

BRUSHMASTER SAW, INC.

Subsidiary of HARRINGTON & RICHARDSON ARMS CO.

ESTABLISHED 1871

WRITE TO: 290 N. WEST ST., KEENE, N. H.

4 ways TO KILL SCRUB TREES WITH DU PONT "AMMATE"

1 For large trees, hack overlapping cuts into the sapwood around the trunk. Pour in enough "Ammate" solution (4 lbs. to a gallon of water) to wet the cut surface all around the tree.

3 Cut small trees with a V-shaped stump. Put a tablespoonful of "Ammate" crystals in the V. You can also use "Ammate" on larger stumps to prevent sprouting.

2 On tough trees, chop notches every six inches near the ground. Put a tablespoonful of "Ammate" crystals in each notch. This deadens even blackjack oak with little resprouting.

4 On seedling trees or sprouts, spray the green leaves and stems when they are fully leafed out using "Ammate," ¾ lb. per gallon of water. Let trees or sprouts stand a year for best kill.

TIMBER GROWS FASTER when you kill Scrub Trees

You can increase the value of timber growth by killing scrub trees with low-cost "Ammate." Forest owners report it gives valuable pines more sunlight, more water and more room for root and top growth. "Ammate" kills blackjack oak, gum, sassafras, elm, willow, persimmon and other weed trees with little or no resprouting.

Ask for this free booklet: *"Improvement of Pine Timber Stands with Du Pont 'Ammate.'" Write to Du Pont, Grasselli Chemicals Dept., 5031 Du Pont Bldg., Wilmington, Del. For supplies of Ammate® ammonium sulfamate weed and brush killer, see the Du Pont distributor in your area.*

DU PONT

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*